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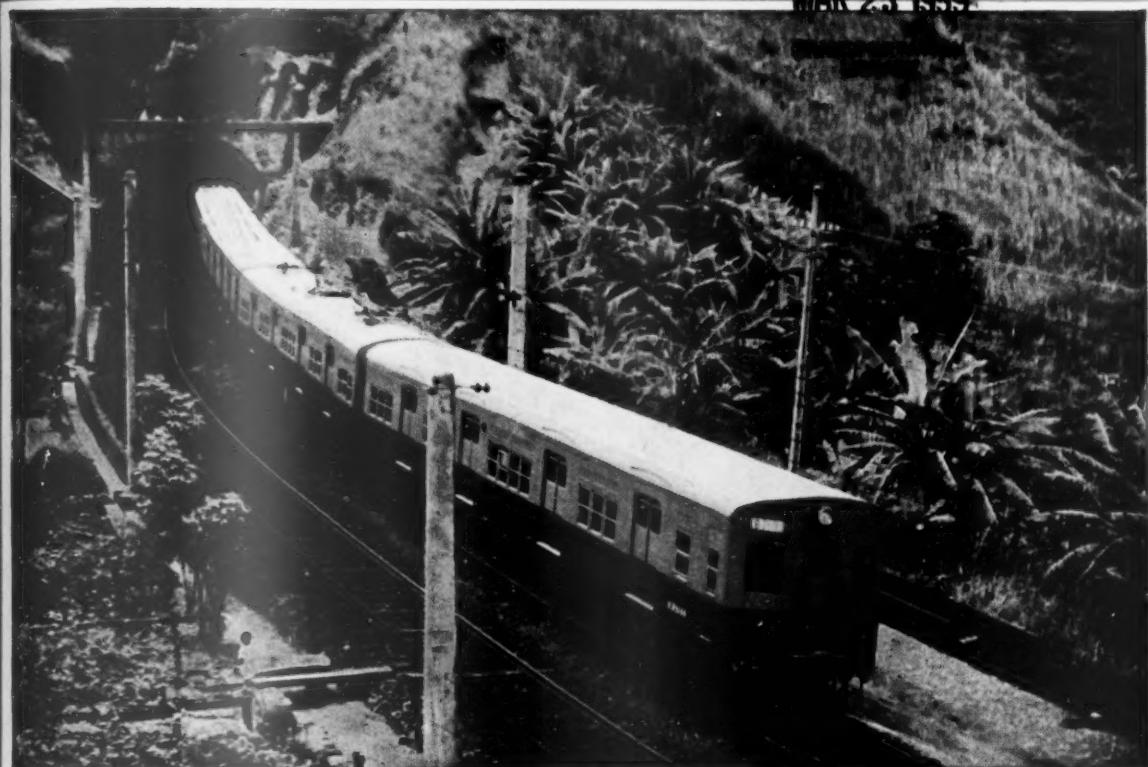
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Investment in the Railways

THE steps taken and efforts made by the former Southern Railway to improve and maintain its plant before and after the last war were referred to in a letter in *The Sunday Times* last week-end by Sir Eustace Missenden, who was General Manager of the Southern Railway for eight years immediately before nationalisation and first Chairman of the Railway Executive in 1947-51. He was supplementing a letter published in the February 15 issue of that newspaper from Sir Philip Warter, Chairman of the Southern Area Board and a Member of the British Transport Commission. The latter had stated that the large-scale modernisation of British Railways had been necessitated by "years of neglect and financial starvation," and that was why a large-scale programme of modernisation was now necessary and why a great deal of the money had to be spent on civil engineering, signalling and telecommunications work, apart from the more readily visible re-equipment with electric and diesel locomotives and modern coaching stock. This letter was the subject of editorial comment in our February 20 issue. Before the war, Sir Eustace Missenden pointed out, the record of the Southern Railway, with its introduction of

the world's largest suburban electrification, much main-line electrification, colour-light signalling, new rolling stock, and the development of the new docks and ocean terminal at Southampton, showed that there had been no "neglect and financial starvation" by the boards and management of the Southern Railway. During the six years of war, maintenance of the Southern, as of the other railways, inevitably suffered. Sir Eustace Missenden also pointed out that the electrification now in progress in the Southern Region was all authorised by the Southern Railway Board after the war and before nationalisation took place, but was indefinitely postponed after nationalisation because of the decision by the Government to invest money in other industries such as steel, shipbuilding, and motorcars. Today a great deal of the money being spent on the railways is making good deficiencies occasioned not only by the exigencies of war but also by the long period of capital starvation which followed. The low priority accorded to their requirements for steel, timber and other materials during the post-war period coincided with an urgent need to repair deficiencies which had arisen largely from intensive over-working during the emergency.

New Stock for the Metropolitan Line, L.T.E.

NEW rolling stock ordered by the London Transport Executive from Cravens Limited at a cost of some £4,000,000 will be used to give an improved service to stations on the outer section of the Metropolitan Line with all eight-car trains instead of the present mixed six- and eight-car peak service. Details are given in our Contracts and Tenders columns. The trains will be saloon type, but with 40 per cent more seats than other saloon type cars now running on the Underground. All seats will be in facing pairs on each side of a central gangway. Parcels racks will be fitted. The vehicles will have lightweight unpainted aluminium bodies, all-rubber suspension for smooth running and economical maintenance, and fluorescent lighting. The use of aluminium panels and light alloy under-frames and body parts will save over five tons of weight per car. The new trains are expected to start coming into service towards the end of 1960 and will all be running when the scheme for improvement on the Metropolitan Line, including electrification of the steam-operated section between Rickmansworth, Amersham, and Chesham, and quadrupling from Harrow to beyond Moor Park, is completed in 1962. Contracts for the traction and control equipment have already been placed.

Locomotive Engineers' Luncheon

THE annual luncheon of the Institution of Locomotive Engineers at the Dorchester Hotel, London, last Friday, was the occasion for a remarkable speech by Sir David Eccles, the President of the Board of Trade, who was the guest of honour. To the 670 members and guests who were present, he referred to the importance of the country of export sales of locomotives and asked whether the British Transport Commission was helping the industry as far as it could. Mr. R. C. Bond, when he proposed the toast of the guests, replied that the B.T.C. was helping the industry to a greater extent than ever before and referred to the joint committee established between the Commission and the manufacturers to deal with matters of common interest. The speech of Sir David Eccles is the subject of editorial comment on page 263 and the proceedings at the luncheon are reported on pages 282-283. Mr. R. Arbuthnott, who presided, introduced Mr. R. A. Smeddle, the President-Elect. It was also announced at the luncheon that Sir George Seel, the Senior Crown Agent, who replied for the guests, will retire at the end of March.

R.E. (Transportation) Army Emergency Reserve

WITH the ending of conscription in Britain, and the gradual run-down of National Service units, the role of the reserve forces, to support regular troops, is becoming increasingly important. Speaking, last Friday, at the Army Emergency Reserve, Royal Engineers (Transportation),

Officers' Reunion Dinner, the Hon. Hugh Fraser, Parliamentary Under-Secretary of State for War, stressed the importance of Transportation units. On them depends military movement in times of emergency. Under a re-organisation of Transportation Reserve, now complete, six squadrons exist, each identified with one of the regions of British Railways. It was reassuring to learn from Brigadier P. D. Buchanan, Commander, A.E.R. Units (Tn. & M.C.), R.E., that the officer-volunteer strength remains satisfactory, though his report of the other-rank position is less encouraging. Under present world conditions, it is essential that reserve units should be highly trained, well equipped, and in a state of immediate readiness. It was a wise move to base Transportation Reserve units on the six railway regions. In this way, it is to be expected the fine spirit of pre-war units, which were drawn from the main-line railway companies, will be upheld. This should do much to stimulate recruitment of all ranks.

New Mineral Line in China

AN example of the new construction now in progress in several countries to serve mines is a line about 200 miles long south-west of Peking. An existing branch of the Chinese National Railways leaves the main Peking-Canton line 35 miles from Peking and runs westwards. This will be extended through Langnan and Wutai to join the Tatung-Taiyuan section at Yuanping, about 50 miles north of Taiyuan, so as to serve the iron mines along the route. A branch about 50 miles long also will be built to the collieries at Hungyuan. The new railway is purely industrial. Its purpose is movement of coal and iron ore to the iron and steel plants at Peking and Taiyuan without increasing traffic on existing main lines. Like all new construction in China, it will be on the 4 ft. 8½ in gauge. Steam traction apparently is envisaged, though a.c. electrification may be decided on if traffic proves heavy.

Motive Power Policy in Belgium

NO further lines of the Belgian National Railways are to be electrified for the time being. The system now used is 3,000 V. d.c. Conversion of the heavily-graded 25-mile section from Liège to the German frontier at Herbesthal, 10 miles west of Aachen, is reported to be considered too costly, as it would necessitate reconstruction of the many tunnels to give clearance for the overhead equipment. It would afford economies in operation, and through electric working from Ostend and Brussels to the frontier, though most of the heavy goods traffic between Germany and northern Belgium, and more particularly Antwerp, is routed via Roermond and Hamont, through an enclave of Holland. This line is mostly level, and no proposals for its conversion have been announced. Electrification has been considered of several steam-worked lines carrying intensive mineral traffic in the area south of Brussels, but diesel operation of these is now preferred. Diesel traction is to be adopted on almost all sections not electrified. Within the next 10 years 760 diesel locomotives are to be placed in service and 1,000 over-age steam locomotives, out of a total stock of 1,400, to be sold or scrapped.

Unlimited Travel over British Railways

ALL-LINE season tickets have long been sold by railways in several countries, mainly to develop tourist traffic. The prices of those offered by the former Austrian Federal and Belgian State Railways soon after the war of 1914-18 were very low in relation to ordinary fares and costs at that time, but all these tickets today are modestly priced. Because of the success of the "Railrover" tickets, valid in one Region, introduced last year by the several Regions of British Railways, the experiment has been extended this year to cover every station in Great Britain. From March 1 until October 31, a seven-day all-line ticket is available by all timetable and advertised excursion trains except Continental boat and ocean liner trains. Travel through some of the finest scenery in Scotland is facilitated

by availability on the Clyde Coast and Loch Lomond services of the Caledonian Steam Packet Co. Ltd. The prices are £22 10s. first and £15 second class, half-price for children, with reductions when one and a half or more tickets are issued to one family. As the ordinary return fares from London to, say, Inverness are £14 4s. and £9 9s. 4d. first and second class respectively, the new facility is good value for the holidaymaker who moves around during the seven days.

Bargain Travel

INDIVIDUAL Regions of British Railways are making vigorous efforts to increase passenger traffic by quoting bargain prices. The Eastern and North Eastern Regions besides each offering its own "Railrover" tickets, are selling a combined ticket valid throughout both Regions for seven days. The prices are £13 10s. first and £9 second class. These compare with ordinary return fares of £8 8s. and £5 12s. from London to Berwick-on-Tweed. In view of the elongated area, north to south, covered by the two Regions, a good deal of travelling eastwards and westwards is necessary to take advantage of this ticket. The "Starlight Special" trains between London and Glasgow and Edinburgh at weekends in the summer season, which command the modest second class return fare of £4 5s., are designed to tap a large potential source of bulk passenger travel between large population centres. This year the Scottish Region has gone further to win business from the lower-income groups by offering a deferred payment scheme for this service. Passengers booking in Scotland can ensure seats for the journeys to London and back by paying a deposit of £1. The balance must be paid not less than 14 days before the outward journey.

New Underground Station

THE new underground station at Notting Hill Gate, described and illustrated elsewhere in this issue, is a considerable engineering achievement and one which substantially will increase public safety and alleviate inconvenience. Until now, the changeover from Central to Circle lines at Notting Hill Gate had to be achieved by crossing one of the busiest roads in London. By combining the two stations in one and providing subway interchange, the London Transport Executive has presented metropolitan travellers with an amenity which doubtless will draw considerable public approval. Two interesting technical features are connected with the scheme. One is the use of a 15-ft. vertical service shaft from which excavation work was carried out, thus permitting normal traffic to continue undisturbed during the reconstruction. The other is that the path of one of the escalators lies directly through one of the existing lift-shafts. Because of this, work had to be so planned that alternative platform access was available before excavation began on the escalator tunnel. Considerable skill and ingenuity have been exercised throughout the project, which possesses practical layout and pleasing architectural design.

Industrial Film Festival

THE second Festival of Films in the Service of Industry will take place at Harrogate from April 21 to April 25 inclusive. It will be opened by the Rt. Hon. Viscount Chandos, Chairman of Associated Electrical Industries Limited, and the President will be Lord Godber, Chairman of the Shell Petroleum Co. Ltd. Speaking recently in London, Lord Godber stated that, of the 260 films entered competitively for the Festival, just over 100 will be chosen for exhibition at Harrogate. Subjects cover public relations, sales promotion, education and training, health and safety, productivity and efficiency, and human relations and welfare. Three new awards cover the film judged most likely to promote British exports; the film judged to provide the best exposition of scientific principle underlying an industrial process, and the film judged to provide the best presentation of science to the public. In addition

to the competing British entries, films from eight overseas countries have been sent on a non-competitive basis. The Festival will include an exhibition of equipment and services at which many prominent manufacturers have taken stand-space.

Brush Type "2" Locomotives for Eastern Region

BRITISH Railways, Eastern Region, has taken delivery of the first of the new series of 60 Type "2" A1A-A1A diesel-electric locomotives, with increased power, built by the Brush Electrical Engineering Co. Ltd. This is six weeks ahead of the contracted delivery date. All 60 should be available for work on the Great Eastern Line of the Eastern Region by the end of this year. Construction and appearance are similar to those of the previous 20 Brush locomotives of 1,250 h.p., but the Mirrlees JVS12T, vee-12-cylinder, turbo-pressure-charged engine is now rated to develop 1,365 b.h.p. The locomotives are intended for mixed-traffic work, but some of them, to be delivered later in the year, will have higher gearing to make possible a maximum speed of 90 m.p.h. on passenger trains. The first of these locomotives, No. D5520, is illustrated on page 286.

Locomotives for New Zealand

THE first of 18, 400-h.p. 40-ton Bo-Bo diesel-electric locomotives ordered for the 3-ft. 6-in. gauge New Zealand Government Railways from British Thomson-Houston Co. Ltd., was recently shipped. Another will be shown at the exhibition of the Association of Supervising Electrical Engineers at Earls Court, London, on March 17-21. One of the series is illustrated on page 274. The mechanical parts were supplied by the Clayton Equipment Co. Ltd. The locomotives will be used in the North Island, primarily in yards and wharves where axleloads are restricted. They can haul main-line trains at 40 m.p.h. To minimise noise in areas adjoining the railway, special attention has been paid to exhaust silencing of the twin power units, housed in individual bonnets, one at each end. The engines are Rolls-Royce eight-cylinder units, mechanically pressure-charged, each developing 210 b.h.p. at 1,800 r.p.m. and direct coupled to B.T.H. traction generators. Two axle-hung B.T.H. motors are wired in parallel to each generator, but for shunting, the four motors may be switched to series/parallel wiring for use with one generator only, whilst the other is shut down. The maximum tractive effort is 22,500 lb.

L.T.E. Underground Service Alterations

THE alterations in London Transport Underground train services effective from last Monday include increases in train intervals between 10 a.m. and 4 p.m. on Mondays to Fridays on the northern extremities of the Northern Line, and termination, during that period, at Rayners Lane of the Piccadilly Line trains which run through to and from Uxbridge at other times of day. The resultant inconvenience to passengers is small. On the High Barnet and Mill Hill East branches beyond Finchley Central the service interval is not more than 15 min. which is reasonable for an outer suburban area in off-peak hours, and Finchley Central, which retains its 5-min. service, is being shown on Northern Line platform indicators. Uxbridge passengers by the Piccadilly Line can change to and from Metropolitan Line trains without leaving the platform at Rayners Lane. The through services between Uxbridge line stations and Central London by both Piccadilly and Metropolitan Lines have been a luxury in the middle of the day. These alterations are designed to effect economies essential to enable London Transport to pay its way. Other modifications in services include measures to improve the regularity of services which will benefit passengers on several Underground lines. London Transport Executive has shown considerable skill in adjusting services to give the best possible service to the majority. There has been no curtailment of peak-hour train services.

The B.T.C. and Locomotive Exports

THE annual luncheon of the Institution of Locomotive Engineers has earned a high reputation as a meeting point for all who are concerned with the use, manufacture, or sale of locomotives and similar products. It is recognised as one of the most important railway functions of the year, and the quality of the guests it attracts bears testimony to the international esteem in which the Institution and its members are held. Important matters of wider than domestic interest have been ventilated in the past by the principal speaker at these luncheons, who is usually a Minister of the Crown; but seldom so direct and controversial an issue has been raised as by Sir David Eccles, the President of the Board of Trade, at last Friday's function.

For many years the national interest of the locomotive manufacturing private industry having an assured part of the home railway requirements has been stressed, largely on the ground that with a basic and planned output from this source, the competitive power of the builders for export business would be increased. Overseas builders in practically all cases have this advantage. When the modernisation plan of British Railways began to be implemented, there was, of necessity, a fairly broad spread in building between railway works and those of the private builders. More recently, it is apparent from the plans announced and the contracts let, the proportion of work allotted to the industry has shrunk while that placed with the railway shops has grown. This has occurred at a time when export business has become increasingly difficult to obtain.

It was against this background that Sir David Eccles spoke. He asked whether the British Transport Commission was a help or a handicap to the sale of railway equipment overseas. A very large sum of taxpayers' money was going into the B.T.C., quite rightly, to modernise the railways. The B.T.C. had just as much a stake in the export trade as any locomotive builder, because the programme would be cut if exports and the balance of payments went wrong.

It seemed to him that a locomotive buyer from overseas would say: "It looks very nice what you are selling us, but have you ever used it at home? Can we see it in operation? Who has proved the worth of this equipment?"

He wanted to know, because the B.T.C. had inherited the position of a big manufacturer with large engineering works, whether it was helping as much as it could in the export field. It was very important that there should be at least the capacity to prove a piece of equipment at home and then use that advertising to sell it abroad. He contrasted the position of the British and the American locomotive builder. "It is easy for the man who manufactures locomotives in the United States. He simply telephones the president of some United States railway and gets him to use the lot. He gets a gratuitous advertisement from the United States railway when he is trying to sell the same machine in Mexico or elsewhere.

In his view either the Commission should make railway equipment and itself sell it abroad or the manufacturer should do it. What would not be right for the United Kingdom would be to have a nationalised railway system at home and by that deprive ourselves of the push and advertising material necessary to sell our products abroad. To have large orders and a big industrial advance in this country it was vital to have enough exports.

Sir David Eccles also promised to study any case which was put to him for better export credit terms for locomotives and railway equipment, but only in exceptional circumstances could he envisage embarking on a credit race with the United States, the practice of which was different.

When Mr. R. C. Bond, Technical Adviser, British Transport Commission, replied, he said that the B.T.C. was helping the locomotive industry to a greater extent than ever before. Under the guidance and leadership of Sir Brian Robertson there was an entirely new spirit abroad. Large orders for locomotives had been placed

and a joint technical committee had been set up between the manufacturers and the B.T.C. from which considerable results were expected. The experience gained from the new locomotives would be available for those to be built and sent overseas. Equally the B.T.C. hoped and expected to receive much useful information from experience gained on overseas railways.

Civil Engineering Aspects of Electrification

Some of the many problems involved in the changeover from steam to electric traction are considered in a paper entitled "Development in overhead electrification of railways as it affects the civil engineer" discussed at the Institution of Civil Engineers in London last Tuesday. The author is Mr. R. E. Sadler, Assistant Civil Engineer (Modernisation), British Railways, Eastern Region. The subject covered is so diverse that the author has been able only to choose a few items for general discussion. No attempt is made to include details of some of the larger new works which are directly associated with electrification, because most of them would each require a complete paper. For the same reason only general reference is made to the works needed to bring the tracks up to standard for high-speed running and to the structures which support the overhead conductors.

On track conditions Mr. Sadler states that once a decision has been taken to electrify a route, it is essential to bring the track bed, the drainage system, and the track itself up to a high standard. There are three main reasons for this. The first is the difficulty of making extensive improvements after the new and generally much increased service has been brought into service, because it is important for the track to be at all times resistered, with regard to line and level, with the overhead current collecting system.

The second main reason for improving the tracks is allied to the treatment received from electric locomotives, as they are generally designed at the present time. The third and very important reason is the necessity to provide for higher speeds, which may involve substantial realignments. In the past, he points out, unsprung loads have not formed a significant feature of the steam locomotive, because, providing the motion was reasonably balanced, the greatest weights came upon large-diameter coupled wheels and the tyre-rail contact area was large. The advent of the small-wheel uncoupled electric locomotive with nose-suspended traction motors has greatly accelerated the deterioration of track; end batter of rails, allied with sagging joints and shelling, has become common on a standard of track which gave good service under steam. This problem is being met to a large extent by the use of long welded rails.

The cost of raising overbridges to provide sufficient pantograph clearance is high. Individual figures in the author's knowledge and at prices ruling in the autumn of 1957, differ from a few hundred pounds to nearly £150,000 a bridge. In cost per route-mile, the sums, again at 1957 prices, have come out as high as £15,000, but some even higher figures have occurred.

The raising of bridge decks is usually confined to steel and wrought iron structures of simple spans. Mr. Sadler has seen some remarkable bridge-raising works carried out in the Eastern Region of the French National Railways. In France there are no legal formalities required in connection with the raising of the surfaces of highways concurrently with the raising of a bridge structure. At Thionville a bridge composed of steel girders, continuous over several spans and with a reinforced concrete deck encasing the top flange, was raised complete to give a 17 in. lift at the centre of the bridge. Fifty 100-tonne jacks were used simultaneously. The total weight of the deck was 4,000 tonnes, and the lifting was completed in 1½ days.

If the construction depth of any deck is already at or near the desirable minimum depth and the highway conditions are very restricted then the track is lowered, although in many cases this results in a saucer in the formation which is difficult, and probably expensive, to drain.

The depth of road bed under most lines is not sufficiently deep to support modern traffic needs, so that a completely new formation is required at least 2 ft. below the new rail level. In clay this figure would be much more and might reach 4 ft., including a sand blanket. In the interval which elapsed before restarting work on the Manchester-Sheffield-Wath electrification scheme after the war, some great advances had taken place in constructional methods and relatively shallow pre-stressed concrete pre-cast designs had been developed. The first partially pre-stressed bridge ever to be constructed was built in 1949 and located over the Worsborough Dale branch of British Railways, Eastern Region, at Buck Lane. This new deck replaced a stone arch and the depth/span ratio was 1 : 20.7. In this design, the pre-tensioned, pre-stressed beams were of inverted T-section. These beams, placed singly and side-by-side, became permanent frame-work for supporting the in-situ the pre-tensioned pre-stressed beams were of inverted T-beams.

In this and another earlier example of partial pre-stressed designs, mild-steel longitudinal reinforcement was added between the T-beams to deal with the ultimate-load conditions and to limit the quantity of pre-stressing required, thus reducing the size of the pre-stressed concrete beams, which are the most expensive element in the design.

Passenger Comfort in the Tropics

SECURING for the railways in tropical Africa and Southern Asia of a share, in the form of passenger fares, of increased personal expenditure resulting from greater spending power, is complicated by two factors, unregulated road competition and difficulty in attaining high speeds.

In some countries the Governments have not succeeded in regulating, or have not seen fit to regulate, operation of buses or motorcars plying for hire. Much passenger traffic is conveyed by road vehicles, often overcrowded and in poor mechanical condition, over bad roads, at fares with which the railway cannot compete. This state of affairs originated under European rule in territories where the administration was reluctant to enact appropriate legislation. In some States which have recently achieved independence attempts are being made now to introduce regulation, which is difficult for political reasons. The railways, mostly State-owned, have secured a certain amount of short-distance traffic, in competition with privately-owned buses and motorcars, by introducing diesel railcars or increasing the frequency of the service, as has been done in Ceylon.

Except for the environs of large cities where the railway provides, and is laid out for, a suburban service, electric or otherwise, it is hard to compete with the bus or taxi over shorter distances. Railways in most tropical countries are single, and there are limits, short of increasing the number of running loops or re-signalling, to the speeds which can be achieved with diesel railcars. The expansion of national economies means that the number of goods trains tends sometimes to increase faster than does line capacity.

The limited speed over single tracks and over lines of less than 4 ft. 8½ in. gauge is also a disadvantage in travel over longer distances, though air travel is still relatively expensive. In India spending power has probably increased proportionally less than elsewhere, but trains with overall speeds of only 35 m.p.h. or so, running over distances of 700-1,300 miles, are well filled with third class passengers. In some cases, the payloads of such trains have been reduced by providing more room per passenger even to the extent of providing berths. The number of vehicles also has been limited, to allow faster running. The profitability of such services is doubtful in view of the fares, which are probably too low. The African or Asian passenger with money to spend can, and does, travel by motorcar over relatively long distances where the roads are good enough. Passenger traffic over such distances, from say, 50 to 350 miles, a day's motoring, is likely to be remunerative to the railway. Most railway systems which have introduced diesel traction and some which use steam

locomotives for passenger work, operate trains over these distances, even on the metre gauge, as in India, which can compete with road travel as regards speed.

Comfort is becoming increasingly important. In general, railways in all parts of Africa and Asia are the most pleasant means of travel over all but the shortest distances, except for some river and lake steamers. The standards of upper class accommodation have long been high, and have been much increased by air conditioning. Lower class accommodation in passenger coaches and railcars placed in service on a good many railways recently has been much improved and now often includes fans. Use of carefully chosen colours and materials in passenger vehicles has added to the attractions of railway travel. The difficulty is to adjust fares, payloads, and accommodation. Wanton damage to rolling stock, as for instance in the new Calcutta multiple-unit electric suburban stock, has caused some managements to doubt whether the time has yet come to improve the appointments in lower class accommodation. Experience seems to show that in all countries, including Britain, vandalism in passenger vehicles is sporadic. It seems to be provoked by introduction of new types of upholstery or other improvements in appointments, and waves of destructive acts seem to pass over fairly quickly.

Competition from other forms of transport will increase everywhere. As comfort is a main selling point of railway travel, the greatest possible degree of spaciousness compatible with the payload, economy in weight, and the best possible appointments consistent with reasonable return on the capital outlay will prove worthwhile as the demands of passengers increase. The manufacturers of passenger vehicles have a unique experience of climatic and other conditions on railways in many countries, of the requirements of railway managements, the standards demanded by passengers, varying designs, and of the results achieved with these. They are more conversant than railway managements in non-industrialised countries can expect to be, with development and application of constructional methods and materials to increase strength and save weight; with techniques in lighting, ventilation, and air conditioning; and with materials for furnishing and decoration, which afford comfort and pleasing appearance with durability and economy. Their knowledge and experience are at the disposal of railways all over the world.

Bridge Renewals in Ireland

ON the railway system of Coras Iompair Eireann there are some 3,886 bridges, excluding culverts up to 8 ft. in span. As half of them are brick or masonry arch structures renewals are not extensive. During the past four years the annual expenditure upon them has averaged only £18,522. Nevertheless, the variety in the works entailed has necessitated detailed preliminary planning to suit the peculiar problems of each, and to select the most suitable form of renewal in relation to design, fabrication, erection and maintenance; more than one scheme has often had to be considered. This accounts for the many types of construction outlined by Mr. R. T. Holloway, Structural Assistant to the Chief Engineer, C.I.E., in his paper, "Some Recent Railway Bridge Renewals," presented recently to the Institution of Civil Engineers of Ireland.

The bridges he describes are short- or medium-span structures, including two reinforced concrete road overbridges, three pre-stressed concrete road overbridges, one R.C. footbridge, three riveted and two welded steel girder underbridges. Apart from renewals he also describes some new construction work. The urgency of renewals has usually been decided upon the District Engineer's reports on the conditions of the bridges relative to the traffic carried. In doubtful cases stress records have been taken under live loads at critical points on the bridges with Cambridge stress recorders. The recordings have shown up the superior weight distribution of the diesel over steam locomotives, enabling them, though heavier than many of the latter, to run almost without restriction anywhere on the system. Their lack of hammer-blow

and 14½-ton axleloads are also greatly in their favour. Although a set of standard R.C. designs has been prepared for spans (a) up to 30 ft. and (b) 30-70 ft., experience has shown that except in very short spans, local conditions and developing techniques make the use of standardisation inadvisable.

Most C.I.E. bridge renewals are carried out with 20- or 35-ton steam locomotive breakdown cranes, and rolling or floating in and launching methods are seldom used. Avoidance of interference with traffic and reduction to a minimum of speed restrictions receive prime consideration. For overbridges precast R.C. slabs are used for spans up to 15 ft., but for those over 20 ft. beam or beam-and-slab construction is adopted. For Ministry of Transport loading the optimum width of ell-beam units is 5 ft., but to suit crane loads may have to be less. To overcome the weight problem a composite form of construction, using pre-cast R.C. beams and *in situ* cast slabs, can be used.

The underbridges described in Mr. Holloway's paper include two viaducts on the Mallow-Tralee line. Quagmire Viaduct consists of three spans aggregating 180 ft. in length, carried on high masonry-faced substructure. The new superstructure consists of riveted deck girders 4 ft. 6 in. deep and 60 ft. long, one under each rail, and 7½-in. camber flooring carrying a ballasted track. It replaced through-type lattice-girder spans. Before renewal the centre portions of the piers and abutments were cut down about 3 ft. to accommodate the new bedplates for the deck spans without disturbing the old girders. The end portions of the old decking of each span were strengthened with rolled-steel joists to support the front axles of the cranes, which otherwise were allowed to lift the ends of the new span only when standing over the pier or abutment. One 60-ft. span was erected each Sunday, it being run out on to the old span on a rail truck. It was then lifted by the two cranes on to temporary cross girders resting on the old through girders until the truck, track and decking of the old span were removed, allowing the cranes to lower it into place. The new spans were lifted complete with bracings and plate decking, and weighed 22 tons. The three spans were renewed in this way on successive Sundays.

At Drishane Viaduct on this line there are only two 40-ft. spans, but as the old ones were not strong enough to support loaded cranes, the new 45-ft.-span reconditioned 40-in. × 12-in. broad-flange girders to take their places were bolted together to form a 90-ft. continuous span temporarily. This was placed alongside the bridge and lifted into place when all the timber decking of the old spans had been removed; the 90-ft. span steelwork weighed 20 tons. Over the steel superstructure were placed pre-cast concrete trough-shaped units each 4 ft. long and 7 in. thick, their side walls rising to 1 ft. above rail level to retain the ballast and act as check rails or wheel guards. The concrete in these units was a 1:2:4 mix, using ½-in. maximum size gravel aggregate with a strength of over 4,000 lb. per sq. in. at 28 days. Those units beyond the reach of the cranes were moved out on temporary track laid on the new steelwork.

Considerable trouble has been experienced with steel underbridge spans having trough decking due to impossibility of complete painting and consequent corrosion and fatigue, causing loose rivets. Various types of alternative steel decking have been developed latterly with welding. On one 120-ft. span of the Liffey Viaduct new cross girders carrying flat plating replaced troughing in 1958. As, however, troughing has its advantages, different methods have been adopted to retain it and yet eliminate its ill effects. Measures to prevent ballast from coming in contact with the end connections between troughing and main girders, and to improve waterproofing, have been tried. Moreover, welded troughing end-plates and shear plates on the main girders have been introduced, the contact faces between them being machined, and ½-in. H.T. bolts in ½-in. holes providing lateral security. The eccentricity of the reactions applied to the main girders is thus considerably reduced. Experience with H.T. bolts has proved satisfactory wherever they have been used.

The construction of the four twin tunnels under the

railway embankment to give subway access to the new stand at Lansdowne Road football ground, Dublin, is described in Mr. Holloway's paper. Reference was made to them in our issue of May 11, 1956.

Queensland Railways in 1957-58

THE report on the Queensland Railways operations for the year ended June 30, 1958, a copy of which we have received from Mr. G. V. Moriarty, Commissioner for Railways, shows that the gross earnings of £A33,813,877 were £A1,996,978 less than the earnings in 1956-57. The decrease was due mainly to the drought which prevailed during the year, and to a decline in Mount Isa Mines traffic. Working expenses decreased from £A36,949,761 to £A36,010,789 and exceeded the gross earnings by £A2,196,912. This was a decline of £A1,058,006 over the year 1956-57, when the working expenses exceeded earnings by £A1,138,906. The total deficit after adding interest charges of £A3,452,279 amounted to £A5,649,191.

The following were some of the principal operating results:—

	1956-57	1957-58
	Thousands)	
(a) 3-ft. 6-in. gauge lines—		
Passenger journeys	34,117	33,497
train-miles	7,401	6,910
Goods tonnage carried	8,151	7,475
& mixed train-miles	12,408	11,873
Passenger parcels, etc., receipts	2,476	2,517
Goods traffic	29,843	27,974
Total earnings	35,811	33,814
Working expenses	36,950	36,011
(b) 4-ft. 8½-in. gauge lines—		
Passenger journeys	180	194
Goods tonnage carried	380	349
Total earnings	867	822
Working expenses	840	884

The department has for many years operated a fast goods service from Brisbane to Townsville, but since the introduction on April 14, 1958, of freight trains running at passenger train speeds, an improved service has been given. Advantage is also being taken of passenger trains to give expeditious transit of goods. Wagons are being attached to the Brisbane-Rockhampton and Brisbane-Bundaburg mail trains, involving only overnight transit.

By marshalling at the head of trains selected types of rolling stock with greater drawbar strength the loads of diesel-electric locomotives have been increased. Previously, the maximum through load from Brisbane to Gympie was 520 tons, but this has now been increased to 650 tons. This load can be hauled through to Townsville and increased over sections en route. Whereas 650 tons was previously the maximum load from Bowen north to Townsville, the larger type of diesel-electric locomotives are now hauling loads of 1,000 tons and over.

In 1957-58 4,855,996, or nearly 30 per cent of the 16,586,124 traffic train miles were run by diesel-electric locomotives. At June 30, 1958, there were 58 diesel-electric and 767 steam locomotives on the books of the Department, which shows that the diesel locomotives in proportion are performing a greater share of the locomotive train miles than the steam locomotives.

During the year under review 19 locomotives, five steam and 14 diesel-electric, were placed in service. Five BB 18 Class steam locomotives delivered by Walkers, Limited, Maryborough, completed a contract for 20 locomotives of this class. Australian Electrical Industries Pty., Limited, delivered four 710-h.p. diesel-electric locomotives to complete an order placed in 1952 for 12 of these locomotives. The remaining 10 diesel-electric locomotives received were supplied by the Clyde Engineering Co. Ltd. These main-line locomotives are of 1,310 h.p.

The only new carriage stock placed in service during 1957-58 were 18 second class brake vans constructed in the Ipswich railway shops. Because sufficient loan funds were not available it was not possible to undertake any work during the financial year on the construction at Ipswich of the vehicles of the air-conditioned train, work on which was suspended during 1956-57. A total of 199 wagons

were received, comprising 102 steel louvred covered wagons built by A. E. Goodwin, Limited, New South Wales, 26 refrigeration vans built by the Commonwealth Engineering Co. Ltd., and 71 cattle wagons built in the Ipswich workshops.

Work on quadrupling between Roma Street and Corinda in the Brisbane suburban area was concentrated on the Eagle Junction-Clayfield area, and Nundah Station yard. All major earthworks, with the exception of those in station yard areas, have been completed, and the plate-laying of the new tracks using 200-ft. lengths of 94-lb. rail has kept pace with the works stage by stage. The longest single section introduced in one changeover was at Indooroopilly, where some two miles of track were brought into use in one night.

Erection of steel work for three major buildings at Northgate; the machine and paint shop, the diesel-electric and heavy lifting section of main workshops, and the air-conditioned train and rail motor shed, were completed. The work of roofing, sheeting, and flooring the machine and paint shop has been practically completed.

The U.S.A. Railroad Position

(By a correspondent)

ON February 10 the Association of American Railroads published details of railway revenues and expenses during 1958. Operating revenues for the year totalled \$9,564 million, a decrease of \$942 million from 1957, or 9 per cent. Freight revenue of \$8,071 million was down \$871 million, or 9·7 per cent. Passenger revenue at \$675 million was lower by \$60 million, or 8·2 per cent. Expenses were cut by \$694 million, or 8·4 per cent, to \$7,544 million, but the operating ratio was a trifle higher at 79 per cent.

Net railway operating income (earnings before charges) fell by \$162 million, or 17·5 per cent, to \$761 million. A rise in December earnings of nearly \$18 million, or 30 per cent, may be the prelude to further increases in 1959, but to the end of last year the setback in industry afflicted the Eastern District. Railway earnings were halved and 10 companies left in deficit. On the Pennsylvania Railroad freight revenue fell by 17 per cent and passenger revenue by 11 per cent; despite an 8 per cent reduction in operating expenses, earnings dropped by 72 per cent to \$11·7 million. America's greatest railroad thus earned only \$2,000,000 more than the Western Maryland won by operating 844 miles in freight service and discarding passenger business. The New York Central was in a similar plight, but the Baltimore & Ohio earned \$26·8 million and operated at a ratio of 80·7 per cent against the P.R.R. figure of 84·7, cutting its expenses by 17 per cent. The new organisation of the Pennsylvania into nine regions was expected to improve efficiency all over; it is difficult to see any sign of better performance throughout last year's emergency.

In the Western District there was a brighter aspect. Earnings increased from \$382 to \$388 million, or by 1·5 per cent. Railroads in the North-West held their own, while in the Central Western Region the Santa Fe, Burlington, and Union Pacific, operating 31,600 miles of road, added 11 or 12 per cent over 1957 to their earnings. The Southern Pacific System of 12,350 miles was 5 per cent short of its 1957 operating income. The curtailment of operating expenses and not an influx of new traffic was the chief cause of the improved position generally.

The same tendency is seen in the Pocahontas Region where the coal roads lost about 18 per cent of freight revenue last year owing to the fall in coal output and overseas exports. The Norfolk & Western trimmed its expenses by 22 per cent and was only 2 per cent short of 1957 earnings. Its gradual changeover to diesel traction probably helped to achieve this result and hold the operating ratio down to 65·4 per cent.

This survey of 1958 financial results gives the impression that any significant upturn in industry this year, especially in coal and steel production, will soon end the precarious state into which the U.S.A. railroads slipped in the last quarter of 1957. The volume of transport then contracted sharply and still remains at a low level.

THE SCRAP HEAP

Well Mapped Out

The U.S. Dept. of Commerce has compiled a booklet for the guidance of U.S. businessmen called: "Investment in Australia." It is a most thorough and comprehensive job.

A feature of it is a map showing the railway systems of Australia. A footnote to the map says: "Reproduced by permission of *The Railway Gazette*, England."—From "The Sydney Morning Herald."

Curiously Named Stations

One of the most curiously-named passenger stations on British Railways, Nine Mile Point, was closed after the last service on January 30. Nine Mile Point was located on the Sirhowy Valley line (formerly L.N.W.R.) of the Western Region in Monmouthshire. It owed its name to the fact that originally it marked the end-on junction of two old tramroads nine miles from Newport. Another curiosity of Local nomenclature is the Bridge End Inn, Risca, the next station on the Newport side of Nine Mile Point. This inn takes its name from a famous local landmark, the "Long Bridge" of nearly 40 masonry arches built across the floor of the valley by the Monmouthshire Canal Company about 1803. This viaduct was demolished many years ago after diversion of part of the railway to a more direct course towards Nine Mile Point, but the inn's name has survived unchanged.

U.S.A. Railway Holds Art Exhibition

Reminiscent of the exhibitions of its posters held by the London & North Eastern Railway before the war at the Royal Academy, an art exhibition was held recently at the Duquesne Club, Pittsburgh, by the Pittsburgh & Lake Erie Railroad, part of the New York Central System.

The display was limited to works by

Howard Fogg, of Colorado. Nearly all the paintings, which were commissioned by the railway, related to the activities of the P.L.E.R.R. That reproduced shows the hump at the P.L.E. Gateway Yard, fully mechanised and with automatic control, which was completed in 1958.

Not Dirt Cheap

Dirt in and on locomotives is estimated to cost U.S.A. railways nearly \$139 million (about £50 million) a year, according to an electrical engineer, addressing a conference in Cleveland, Ohio. He estimates that dirt is now responsible for approximately one-quarter of the total cost of maintaining diesel-electric locomotives, of which cost slightly less than half is avoidable.

Lost Sleeper

On October 10, 1958, Workmen's Sleeping Car No. 14WW (a converted B car) was consigned to Workshops Manager, North Bendigo, from Geelong. Enquiries have been made but the car cannot be located. Efforts are to be made to trace this car and, when found, have it consigned to Workshops Manager, North Melbourne.—From *Victorian Railways Staff Notice* dated December 23, 1958.

Joys of Train Travel

Railway stations have now and again struck us all as a trifle dreary and full of sinister echoes. Do we not really find something lovable in this vast emptiness as we walk slowly up the train to Scotland searching for our names in the sleeping car windows? A railway journey can still be now and then a pleasurable experience. Given a long one to some spot such as Penzance, let us say, where the train must stop because it can go no farther, there is a snug, gloating sensation in settling

down in a corner with a good many hours in front of us.—From "The Times."

Rhodes and Railways

At the annual general meeting of fellows of the Royal Colonial Institute, the following resolution was unanimously adopted:—"The fellows of the Royal Colonial Institute take the opportunity of their annual general meeting to express their appreciation for, and sympathy with, the great imperial work which a distinguished fellow of the Institute, the Right Hon. Cecil J. Rhodes, is engaged in promoting in Africa. They also express the view that in the task of carrying both telegraph and railway communication through that Continent Mr. Rhodes should receive every encouragement from Her Majesty's Government."—From "The Financial Times" of February 23, 1899.

Radioactive Hoax

A left luggage office at Victoria Station, British Railways, Southern Region, was closed for several hours last week after a telephone caller had said that dangerous radioactive material had been left there in error. Officials of the Atomic Energy Authority carried out tests and found nothing dangerous. Some passengers had left their passports in suitcases and were unable to travel; others left without their baggage. Later an official stated "It looks as though it might have been a hoax." The Southern Region expressed its sympathy with the passengers whose arrangements had suffered, and stated that any claims for out-of-pocket expenses would be sympathetically considered.

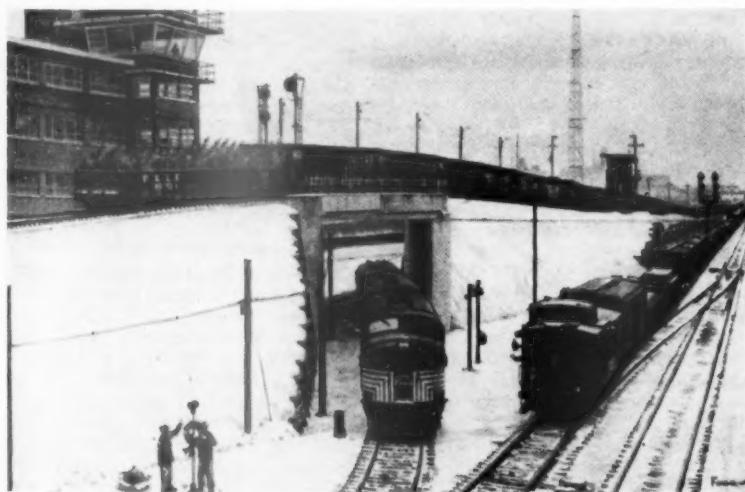
Pen Pals

Once people registered success
By letters published in the Press,
For instance, in the long ago,
Signor Pro Bono Publico
Quite often dipped his pen in gall
And castigated one and all.
The railways were fair game to them,
Whate'er their cognomen, *pro tem*,
And one recalls some hectic spells
Brewed by "Disgusted, Tunbridge
Wells."

They raised Cain if the trains were late
And likewise chanted hymns of hate
If, just to demonstrate they could,
Trains got away before they should,
And this the burden of their song:
"Whatever railways do is wrong!"

Are things much better nowadays,
When P.R.O.s set out to praise
Or, breath in hand, rush to explain
The antics of some wayward train,
With all that saving face entails
When something has gone off the rails?
Well—pen pals who kick up a fuss
(Not often now anonymous)
Find their brief hour of inky fame
Worth many an age without a name;
In wordy warfare still they strive—
And British Railways still survive!

A. B.



Gateway Yard, Youngstown, Ohio, at Christmastide, from a painting by Howard Fogg exhibited by the Pittsburgh & Lake Erie Railroad

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

SOUTH AFRICA

New Telephone Exchange

A new telephone exchange to serve South African Railways headquarters and other railway offices in the Johannesburg area has been installed in the communications building at Johannesburg Station. The introduction of the exchange marked the completion of the equipping of this building, in which is also accommodated a large telegraph and teleprinter office.

The exchange, which is equipped for 2,400 lines extendable to 4,000 lines, consists of one air-conditioned automatic equipment room, a manual trunk exchange which controls the Administration's long-distance trunk network, a carrier equipment room, and a test room. The automatic exchange apparatus is of the British Post Office 2,000 type, using double-homing subscribers uniselectors and two-motion selectors, while the trunk-switching network consists of motor-driven uniselectors.

Single voice-frequency dialling is at present confined to the junctions to Pretoria, but this facility will eventually be extended to all the main centres of the Union for the convenience of the trunk board operators.

The exchange equipment was supplied by Automatic Telephones (South Africa) Limited, and manufactured in Liverpool by the parent company, Automatic Telephone & Electric Co. Ltd.

NEW SOUTH WALES

Silverton Tramway

The Silverton Tramway Co. Ltd., which operates the 3-ft. 6-in. gauge railway between Broken Hill and the South Australian border, may continue as a private concern when the line between Port Pirie and Broken Hill is converted to standard gauge. Sir Thomas Playford, the South Australian Premier, recently discussed the matter with Mr. Cahill, the New South Wales Premier, and suggested that, subject to the Commonwealth's wishes, the privately-owned railway should not be acquired by the States.

NEW ZEALAND

Centralised Traffic Control

At the end of 1958, C.T.C. equipment was in use over 194 miles of the Government Railways. The latest sections to be added were the Greymouth-Stillwater section, 8·7 miles, on November 11, and the Seacliff-Waikouaiti section, 8·1 miles, an extension of the 26·3-mile Sawyers Bay-Seacliff installation operated from Dunedin, on November 26. These two sections are in the South Island.

The principal suppliers of equipment are the Westinghouse Brake & Signal Co. Ltd., Metropolitan-Vickers-GRS

Limited, and the Siemens & General Electric Railway Signal Co. Ltd. Westinghouse supplied the equipment for such installations as the Tawa Flat-Paekakariki and the Frankton-Te Kuiti-Okahukura in the North Island. MV-GRS equipment is in use between Dunedin and Oamaru in the South Island, and between Hihitahi and Mataroa in the North Island. Siemens supplied the equipment in use at Invercargill and Greymouth in the South Island. The mileages of C.T.C. in each Island are now 140 in the North and 54 in the South.

Auckland-Frankton Duplication

A further six miles of double line were added on December 14, 1958, when the Ohinewai-Te Kauwhata section of the Auckland-Frankton line was completed and brought into use for double-line working. Double line now extends from Auckland to the Whangamarino Stream, south of Mercer, a distance of 43·6 miles via Newmarket; from Te Kauwhata to the Waikato River bridge north of Ngaruawahia, 20 miles; and from Ngaruawahia to Frankton, 10·2 miles. The intervening single-line sections remaining are 9·2 and 0·9 miles long respectively. Total route mileage of double line at the end of 1958 was 151.

UNITED STATES

Lightweight Trains

Few of the ultra-lightweight trains produced by various American manufacturers during the past few years, in an endeavour to cut operating costs have found favour with the travelling public on long distance runs, and most of them have been demoted to suburban and outer suburban runs. The Chicago, Rock Island & Pacific Railroad, which already has a "Talgo"-type "Jet Rocket" in suburban working round Chicago, after it had been used for some time in main line service between Chicago and Peoria, has bought from General Motors the latter's two "Aerotrain," which have been tried experimentally by various American railways. These are to be renamed "Suburbanites" and used also in the Chicago outer suburban area.

Rock Island Pullman Services

The Chicago, Rock Island & Pacific Railroad, following the lead of one or two other American railways, has taken over from the Pullman Company the operation of the Pullman parlour and sleeping cars on certain of its through trains which run throughout over Rock Island tracks. These are the "Rocky Mountain Rocket," between Chicago and both Denver and Colorado Springs; the "Imperial," Chicago and Kansas City section; and the "Kansas City Rocket," Minneapolis-Kansas City

section. For the service the railway is issuing its own tariffs and tickets; the aim is more economical working.

Sleeping Car Concessions

A further step has been taken by the Chicago, Milwaukee, St. Paul & Pacific Railroad in providing sleeping car comfort for second class or "coach" passengers. Coach tickets are being honoured in "Toulalux" sleeping cars on the "Olympian Hiawatha" streamline train between Chicago and Seattle-Tacoma, and the cars of this type, which have full sleeping accommodation in convertible "sections," are now reserved exclusively for passengers of this class. The cost on a return journey over the whole distance is \$51.20 less than that previously charged to first class passengers for the same accommodation.

ARGENTINA

Economy Measures

The Government has announced that 18,000 employees of the State Railways who are qualified to retire on pension will be obliged to do so immediately. Over a period of three years, 75,000 more will be transferred to private industry. It is not stated how this is to be done; most industrial firms already are laying off staff. These measures, with the introduction of increased rates, are expected to reduce the deficit for 1959 by 9,000 million pesos and by a further 6,000 million pesos in three years' time.

It has also been decided to withdraw the Presidential trains from the General Roca and General Belgrano Railways and convert them into ordinary passenger stock.

BRAZIL

Diesel Locomotive Deliveries

The Paulista Railway Company recently received delivery of five diesel-electric locomotives from the International General Electric Company as part of an order for 10 locomotives. They will be put into service hauling passenger and freight trains throughout the interior of São Paulo, between Santos, Jundiaí, Bauru, and Campinas.

Concession for Mineral Line

The Minas Gerais State Government has granted to Fernando Souza Melo Viana a monopoly for 60 years for the construction and exploitation of a metre-gauge electric railway for transport of minerals, from Andrelândia to Itabirito, on the Central of Brazil Railway, 150 miles. The contract is subject to proof that the concessionaire has acquired running powers over the Mineira Railway between Andrelândia and Angra dos Reis, and also the right to use the port of Angra dos Reis.

There has long been a dispute as to

the alternative route for mineral trains from the Minas Gerais iron ore region to the coast, avoiding the congested Central of Brazil lines to Rio and the busy port there.

SPAIN

"Talgo" Train Acceleration

The southbound "Talgo" train from Irún to Madrid has been accelerated by 45 min. from February 1, reaching Madrid at 5.30 p.m. instead of 6.15 p.m. In the northbound direction the acceleration amounts to 15 min.

ITALY

Capistrello to Civitella Line

The war-damaged section of line from Capistrello to Civitella Roveto, south-east of Rome, has been repaired and was reopened to traffic on January 4, restoring through rail communication from Avezzano to Roccasecca.

Passenger Traffic in 1958

The number of passengers on the State Railways amounted to 372,752,000 in 1958, as compared with 375,634,000 in 1957. Despite this reduction, passenger receipts rose to Lire 128,216,000,000 from 123,381,000,000 in 1957. In 1958, the State Railways organised 56 tourist train trips, carrying 26,313 passengers. The duration of the trips covered eight to 15 days.

Florence-Rome Line Realignment

Within the framework of its five-year modernisation and development scheme the State Railways plan to carry out a number of realignments on the 196-mile double-track Florence-Rome electrified main line. A number of radii on this line, particularly between Florence and Arezzo, a distance of 54 miles, though widened in recent years are still too narrow for high-speed main-line working. When the curves have been flattened and certain gradients reduced, it will be possible for high-speed trains to cover the distance between

Florence and Rome in less than 2 hr. non-stop, compared with the present shortest timings of 2 hr. 55 min. southbound in the case of the "Freccia del Vesuvio" (Vesuvius Arrow) or the "Settebello." Northbound all trains take a little longer including the "Freccia del Vesuvio" and the "Settebello." Both cover the distance non-stop in 3 hr. 5 min.

Closure of Narrow-Gauge Lines

Three narrow-gauge sections of the State Railways in Sicily have been closed to traffic, the Dittaino-Leonforte line from January 20, and the Palermo-Burgio and San Carlo-Salaparuta Poggioreale lines from February 1. The standard-gauge rack line from Saline di Bolterra to Volterra has been closed to traffic as from November 21, last year.

SWITZERLAND

Lake of Constance Wagon Ferry

Over 30,000 wagons were conveyed by the Lake of Constance ferry services between Romanshorn, in Switzerland,

and Friedrichshafen in Germany in 1958, 5,000 less than in 1957 and 8,000 below the 1956 total. Reconstruction of the ferry dock at Friedrichshafen necessitated suspension of the ferry service between October 20, 1958, last and mid-January. Traffic was diverted to the Kreuzlingen (Switzerland)—Constance (Germany)—Singen line.

FRANCE

Railcars for Tourist Routes

The first of 10 800-h.p. observation-type diesel railcars built by Renault Limited for the S.N.C.F. has been completed. The cars are for use on tourist routes. The passenger accommodation is in three sections. A compartment at each end seating 22 passengers, and an observation dome in the centre above the engine compartment, seating 44 passengers.

The windows of the dome are double-glazed. The two panes of glass are separated by a sheet of transparent plastic material in which there is an electric heating element. The cars are air-conditioned throughout.



French National Railways 800-h.p. diesel railcar for tourist routes

Publications Received

Welding Handbook, Section 2: Welding Processes, Gas, Arc and Resistance. Fourth Edition. London: Cleaver-Hume Press Limited, 31, Wright's Lane, W.8. 9½ in. x 6½ in. 528 pp. Illustrated. Price 72s.—The European edition of a publication by the American Welding Society includes contributions by members of the society concerned with welding developments in industry. Section 2, devoted to methods of welding, is one of a set of five to be published at yearly intervals revising the previous single-volume edition. It gives detailed information on gas welding, carbon-arc, metal-arc in all its forms, both bare and shielded, also spot, seam, projection, flash, upset, and percussion welding. This is the section

most likely to appeal to those who will not need the whole set of five. The pressure-gas welding of rails is described briefly with illustrations but there is no mention of flash-butt rail welding common in Britain. Separate chapters describe the equipment used for each welding process. The final chapter shows standard symbols used by the American Welding Society and examples of their use to aid designers in giving clear and exact instructions on drawings.

Hydraulic Machinery.—A 29-page catalogue "Hydraulic Machines and Equipment" describes presses, pressure pumps, and other hydraulic machinery manufactured by the Leeds Engineering & Hydraulic Co. Ltd., of Rodley, Leeds. The equipment shown includes

hydraulic wheel presses for assembling the wheels and axles of locomotives and rolling stock, railway drop-pit jacks of hydraulic and hydro-pneumatic operation, spring buckle presses for forging buckles on laminated springs, a buckle stripping press, and spring scrapping presses in versions to suit the scrapping and setting of both laminated and coil springs. General-purpose presses for loads of up to 500 tons are also shown, and many special purpose tools such as hydraulic pipe benders, a straightening press, and an exceptionally sensitive one for use in physical laboratories using town's main water at only 30 lb. per sq. in. Other special-purpose equipment illustrated includes a testing machine for proof stressing large components to reproduce service loading conditions.

Devons Road Motive Power Depot, London Midland Region

Conversion almost complete of depot maintaining diesel locomotives used for freight transfer workings between docks and British Railways marshalling yards



Removing cylinder-head covers and filters on a main-line diesel locomotive in preparation for running adjustments

CONVERTED from a steam-locomotive depot and developed exclusively for the maintenance and stabling of diesel locomotives, the Devons Road Motive Power Depot of the London Midland Region at Bow, in East London, handles locomotives used on shunting and freight-transfer duties between installations of the Port of London, North of the Thames, and marshalling yards of the London Mid-

land and other Regions of British Railways. As recorded on page 288 of our September 5 issue, the last steam locomotives left Devons Road in August, 1958. The depot provides the motive power for working freight trains between Poplar Docks and Acton, Western Region, Stratford, Eastern Region, and Willesden, London Midland Region, over the lines of the former North London Railway.

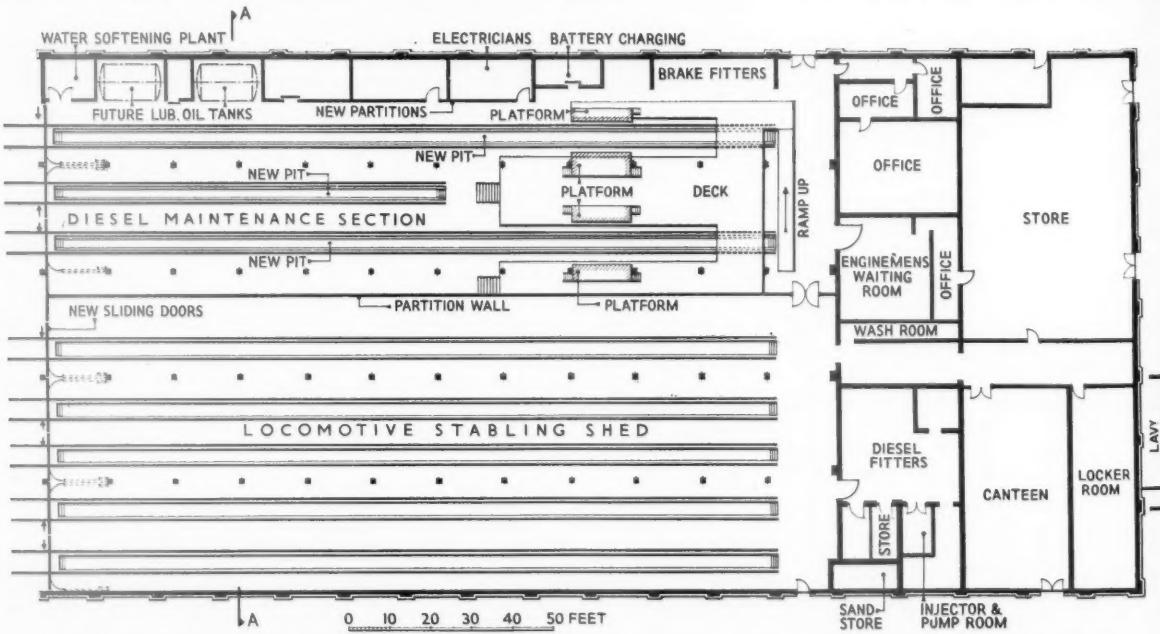
With the former steam-hauled trains, operation was confined to time when line occupation by passenger trains was lightest. The improved operation and the reliability of the diesel locomotives now in use has made it possible for freight trains to be run in margins between passenger trains throughout the day. Recent improvements in the diagramming have resulted in a reduction in the number of Type "1" locomotives required to maintain the service from 25 to 22.

Servicing

The servicing facilities cater for 22 Type "1" diesel-electric main-line locomotives and eight diesel shunters. The allocation at present consists of 12 English Electric 1,000-h.p., 10 B.T.H./Yorkshire Engine Company/Paxman 800-h.p. and eight diesel-hydraulic North British/M.A.N. 330-h.p. shunting locomotives. Normally it is possible to accommodate at one time in the maintenance shed, three of the main-line locomotives and one shunter.

Three Pits Re-made

Three tracks of the existing brick-walled steam sheds have been partitioned off and the part so formed is completely transformed with modern lighting and gas-fired space heating, the removal of smoke troughs below the concrete roof, and use of a light colour scheme. Staging has been erected across the end and between tracks, at footplate level and the main access to this is by a sloping ramp. Special platforms



Plan showing location of new diesel-maintenance section in existing shed at Devons Road Depot, L.M. Region



A 'Type E' locomotive being refuelled: pumps can deliver at 1,600 gal. per hr.

can be moved into position sideways on slides to give close access to the narrower locomotive machinery compartments. The inspection pits are illuminated from recesses in the sides.

An 800 to 1,000-mile examination is required to be carried out on each main-line locomotive and this occurs approximately once a week. In addition heavier examinations are scheduled to be carried out at mileages which are multiples of these figures.

Nine grade-1 fitters, specially trained at the locomotive builders' works, and five grade-1 electricians, form the basis of the depot maintenance staff.

Earth-proved 230 V. power sockets are provided for electrical equipment including a Sturtevant vacuum cleaner used for cleaning locomotive control cubicles and traction motors. Separate 50 V. sockets are installed for hand-

inspection lamps and portable power-operated tools and equipment.

A Legg double-circuit charger provides current at 110 V. d.c. for locomotive batteries.

Preliminary Inspection and Testing

Much of the preliminary work such as cab inspection and testing the correct functioning of sanding gear can be completed before the locomotive enters the shed.

Checking the oil level in the Voith torque converter on a North British/M.A.N. 330-h.p. shunter and topping

tions are lifted, machinery compartment doors opened, and the sliding platform moved into the desired position, work is started on the removal of air filters for cleaning and engine covers are detached for valve gear tappet checks and so on to be carried out.

A pre-arranged maintenance procedure is followed in accordance with the schedule of standard examinations which has been drawn up by the Chief Mechanical and Electrical Engineer.

The brake-blocks used on all the main-line locomotives are of British Railways standard design. The benefits



Topping-up the hydraulic transmission unit of a diesel shunter outside the maintenance shed

up, occupies two fitters for only 10 to 15 min. A semi-rotary hand pump is used to feed the oil through a flexible hose into the transmission unit, the filler plug of which is accessible in the locomotive cab.

After a main-line locomotive has been driven into position over the inspection pits and between the high-level platforms, the hinged bonnet-roof por-

gained from interchangeability are reflected in the speed with which a repair or overhaul can be carried out.

Checks for Leaks

After every engine overhaul, it is usual to check the unit for external coolant leaks and oil leaks during the initial run-up and again after a brief period on full load when temperatures and pressures have risen to the operating levels. In addition engines are run-up and checked daily by depot servicing staff before the locomotives go out into traffic.

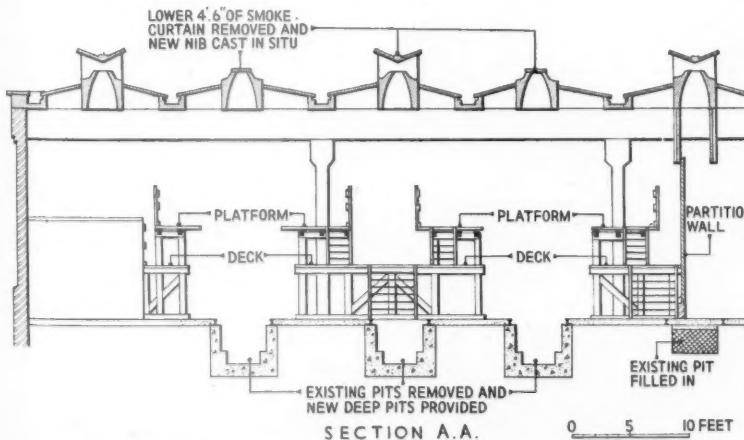
Occasionally it is necessary to withdraw a cylinder liner to renew the water-joint rings. This work requires the use of overhead rail-mounted lifting tackle, and gear supplied by the engine maker.

The depot has a Permitit base-exchange water treatment plant, the chemicals of which may be regenerated by the addition of common salt.

Stores

There is adequate accommodation in the stores for the many parts of electrical and mechanical spares required. Separate rooms are provided for fuel injector testing, battery charging, and other specialised functions. The mechanical foreman's office has

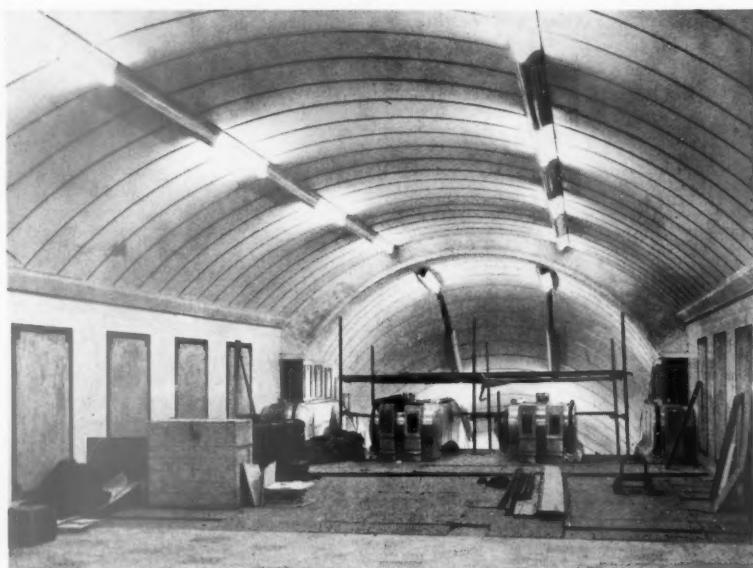
(Continued on page 274)



Sectional end elevation: platforms on left are shown moved into close-access position

New Underground Station at Notting Hill Gate

Million-pound reconstruction carried out without disturbance to traffic



Top flight of escalators under installation

THE most extensive station reconstruction to be undertaken in post-war years by the London Transport Executive is almost complete at Notting Hill Gate. The project, which cost £1 million, links the Central and Circle lines by a joint ticket hall beneath the road, thus providing direct interchange facilities by subway. Previously, passengers transferring from one line to the other had to cross the busy road between the two stations. This road, which carries a daily average of 32,000 vehicles, is being widened under a London County Council plan from 30 ft. to 60 ft.

Two particular difficulties were the problem of allowing traffic to continue undisturbed during the work and the proposed path of one of the three new flights of escalators. This lay directly through an existing lift-shaft.

The first problem was solved by carrying out all excavation from a 15-ft. vertical service shaft. To overcome the second difficulty, work on the third flight of escalators was delayed until completion of the installation of the first two flights, and of a short fixed stairway leading to the lowest level (the eastbound Central Line). With alternative access to the lines now available, the lifts can be taken out of service and work begun on the third flight of escalators. When this is complete, the fixed stairway will be relegated to emergency use.

Complete by March 1 were the new ticket hall with pavement entrances on the south side of Notting Hill Gate, an interchange subway between the two lines, two flights of escalators, and the fixed stairs to the eastbound Central

Line. By the end of this year, pavement entrances on the north side of Notting Hill Gate and a subway beneath the road will be ready for use.

Because of the elevation of the area, both railways are at a depth greater than is usual. The eastbound Central Line platform lies 100 ft. below the surface. The westbound tunnel lies partly above and to one side of the east-

bound tunnel because the original tunnels were aligned within the width of the street.

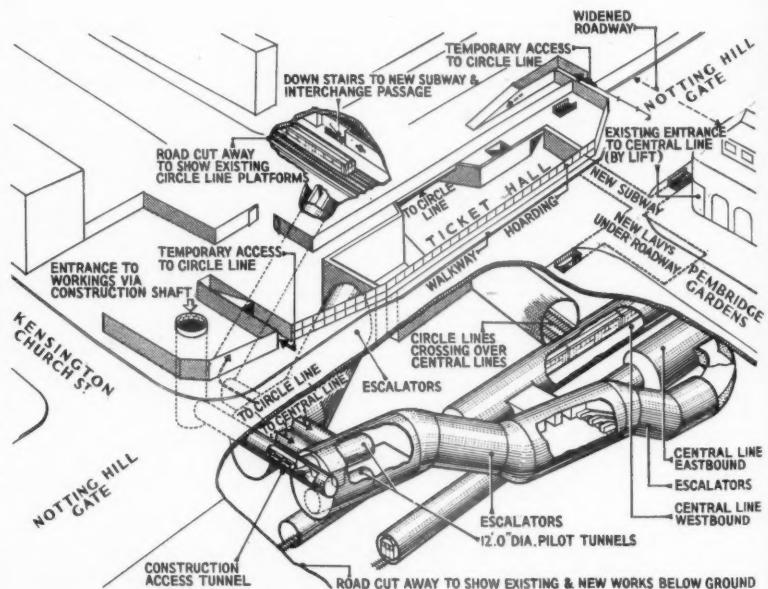
Asymmetrical Ticket-hall

The new ticket-hall lies partly under the widened road and partly inside the new building line. Irregularly-shaped, it attains a length of 145 ft. and a width of 55 ft. Average width is about 40 ft.

Walls and floor (which is approximately 12 ft. below the surface) are of mass concrete, 4 ft. and 3 ft. thick respectively, the roof and floor acting as struts to the walls. Under the road, the roof is of steel beam construction with concrete filling and designed to carry the heaviest British Standard road loading. Under the building line, the roof is of concrete-covered steel troughing designed to carry a uniform floor loading of 100 lb. per sq. ft.

Colour and form have been used to good effect throughout. The front of the ticket office is curved, faced with green and blue plastic sheet below counter height, and finished with low-level aluminium ventilators opening from the office. Above, reeded glass framed in aluminium extends to the ceiling, which is continuous from passenger to office area. Clerical accommodation is well planned, and good cupboard space has been provided for the storage of ticket materials. Staff rooms include an office for the Station-master.

Aluminium is used also for the barriers in the ticket hall and, combined



Drawing representing general scope of work at Notting Hill Gate above and be'ow ground

with panels of plastic and glass to match the fascia of the office, for ticket collectors' boxes.

The hall also contains a bookstall, tobacco kiosk, and public telephone booths.

Because the hall is sited over the Circle Line tracks, which lie only 27 ft. below street level, it was necessary to demolish the upper part of the brick arch over the tracks during construction. This was done without interference to traffic by the erection within the arch of a shield on steel ribs.

Stairways and Escalators

Four stairways will give street access to the ticket hall. These entrances, at first temporarily covered, eventually will be incorporated in frontages of new buildings. Pavement entrances on the corners of Notting Hill Gate and Pembridge Gardens will give access to the ticket hall by a short subway, which will lead also to new public lavatories now being built under Pembridge Gardens for the Royal Borough of Kensington.

Stairways give direct access from the ticket hall to the Circle Line, and two flights of escalators lead to the westbound Central Line. A short staircase leads from that level down to the eastbound Central Line, which is about 16 ft. lower. These are the stairs which will be superseded by the third flight of escalators yet to be installed. Fixed stairways between each pair of escalators could be replaced by more machines, if required.

The top flight of escalators is operated by 40/48 h.p. electric motors by Laurence Scott & Electromotors Limited and runs at a fixed speed of 120 ft. per min. Each escalator covers a vertical distance of 31 ft. to connect with the centre landing, which is 43 ft. below the surface. From this point, a 200-ft. interchange subway leads to two stairways serving the Circle Line platforms.

The second flight of escalators has a vertical rise of 37 ft. 7½ in. The down escalator, operated by a Laurence Scott 40/48 h.p. motor, runs at a fixed speed of 120 ft. per min. The up escalator, driven by a Lancashire Dynamo motor of 40/20 h.p., is fitted with speed-ray control which allows it to run at an idling speed of 60 ft. per min. when not in use by passengers. When in use, speed automatically is accelerated to 120 ft. per min. until the machine is clear of passengers.

The third and lowest flight of escalators also will be fitted with speed-ray control. These machines will have a vertical rise of 16 ft. 9 in. and will be driven by 20/10 h.p. Lancashire Dynamo motors.

Panelling for the escalators is of satin-finish aluminium, an innovation for the system. Ceilings and landing tunnels are of curved plastic sheets with aluminium cover strips. Three colours are used through the different levels: grey, pink, and yellow.

These pastel shades combine to

increase the impression of light and space which has been achieved by the general layout.

Practical Design

Landing ceilings are flat, incorporating 2-ft. square white asbestos V-jointed boards. Into these, and recessed behind egg-crate grilles, are fluorescent light fittings designed by the Architect's Department of the London Transport Executive.

Floors are finished with 12-in. square concrete tiles of buff and green. Walls are high-gloss-tiled in contrasting shades.

All decorating materials were chosen to give a contemporary look and to avoid expensive maintenance.

A new feature is provided by the aluminium grilles fitted to the upper part of the two head walls of the middle landing. These screen openings to the pressure-relief tunnel left between the two parts of the landing. The inside of the tunnel is painted dead black and the distant effect is of a black and silver wall.

Independent ventilation systems operate for platforms, escalators, passageways, and staff rooms.

Excavation Work

Tunnels are almost entirely lined with cast-iron segments. Those for the two upper escalators are 22 ft. 9 in. in diameter, those for the landings and machinery spaces are 29 ft. 6 in. and 26 ft. respectively in diameter, and that

of the third and lowest escalators will be 23 ft. 2½ in. in diameter. The interchange subway is in a 15-ft. dia. tunnel, and ventilation tunnels are 6 ft. in diameter.

Underpinning was necessary for about 50 ft. of the wall supporting a street over the Circle Line, and temporary steel beams had to be used to carry Circle Line track during construction of the interchange subway. Six water and three gas mains, together with a number of smaller pipes and other cables, had to be diverted and realigned and their new accommodation allowed for in the design of the subway roof. Additional timbering was used at the working face for the centre flight of escalators, the tunnel of which twice approaches a distance of 4 ft. of those of the Central Line.

All tunnels were driven in "free air" by hand with pneumatic spades. Except in the case of the centre flight of escalators, tunnelling was carried out in two daily working shifts, five days a week. Work on the centre escalator tunnel was continuous in three 8-hr. shifts daily. Average weekly progress was five rings (7 ft. 6 in.) in the 29 ft. 6 in. dia. tunnels, five rings (6 ft.) in the 26 ft. tunnels, and six rings (9 ft.) in the 22 ft. 9 in. dia. tunnels.

Although the original Central Line station building still stands, this, like the Circle Line building, will be demolished now that the lifts have been taken out of service. The shafts will be used for ventilation, which will be



Partly finished middle landing leading to second flight of escalators

provided by a pressure system operated by a fan in the disused stair-shaft and a draught-relief fairway via the lift-shaft. Two tunnels, respectively 240 ft. and 170 ft. in length, will connect the lift-shaft with those of the east- and westbound Central Line. A construction access tunnel linking two sections of the middle landing has been retained as part of the pressure-relief system.

Civil engineering work is being carried out under Mr. C. E. Dunton, Chief Civil Engineer, and architectural work under Mr. Thomas Bilbow, Architect, both of the London Transport Executive. The consulting engineers are Messrs. Mott, Hay & Ander-

son, and the civil engineering contract is let to Balfour Beatty & Co. Ltd. The building and finishing contract is being carried out by L. & W. Whitehead Limited.

Escalator equipment is being supplied to the requirements of Mr. A. W. Manser, Chief Mechanical Engineer (Railways), London Transport Executive, by the Otis Elevator Co. Ltd.

The road works with which the scheme is associated are the responsibility of the London County Council.

Chief sub-contractors are as follow:

False ceilings . . . Anderson Construction Co. Ltd.
Wall tiling . . . Carter & Sons (London) Ltd.

Floor tiling . . .	McNab & Co. (Flooring) Ltd.
Ticket office front . . .	D. Burkle & Son Ltd.
Ticket office fittings . . .	
Collectors' boxes . . .	
Glazed notice cases . . .	
Aluminium barriers . . .	
Aluminium vent grilles . . .	
Steel access stairs to machine chambers . . .	
Handrails and balustrades . . .	
Rubber flooring to escalator trays . . .	Light Steelwork (1925) Limited and Marley Tile Co. Ltd.
Sprinklers in bookstall and tobacco kiosk . . .	Marbolith Flooring Co. Ltd.
Collapsible gates . . .	
Independent . . .	Mather & Platt Limited
Public telephone booths . . .	Potter Rax Limited
Bookstall fitted for W. H. Smith & Son Ltd. . .	Supplied and erected by G.P.O.
Tobacco kiosk fitted for T. Leon & Co. Ltd. . .	Eustace & Partners Limited
	Rudduck & Co. (Shop-fitters) Ltd.

Devons Road Motive Power Depot, L.M.R.

(Concluded from page 271)

attached to it a fitters' room for the signing of repair and examination documents.

Wakefield-Dick Lubriequipment oil dispensing units of the portable hand-operated type are used in conjunction with 3-gal. containers and larger quantities of engine and hydraulic-transmission oil are carried in 40-gal. drums mounted on Donald barrel trucks.

Bulk lubricating-oil storage tanks and pumping equipment is on order for delivery early this year.

Fuel-oil Storage

The delivery of fuel-oil to locomotives is through a strainer and a Wayne 1½-in. industrial meter with 11-in. dial. This type of instrument is capable of metering flow-rates of 150-1,600 gal. per hr. The counter-balance swing-arms and pressure-connections are of Emco manufacture.

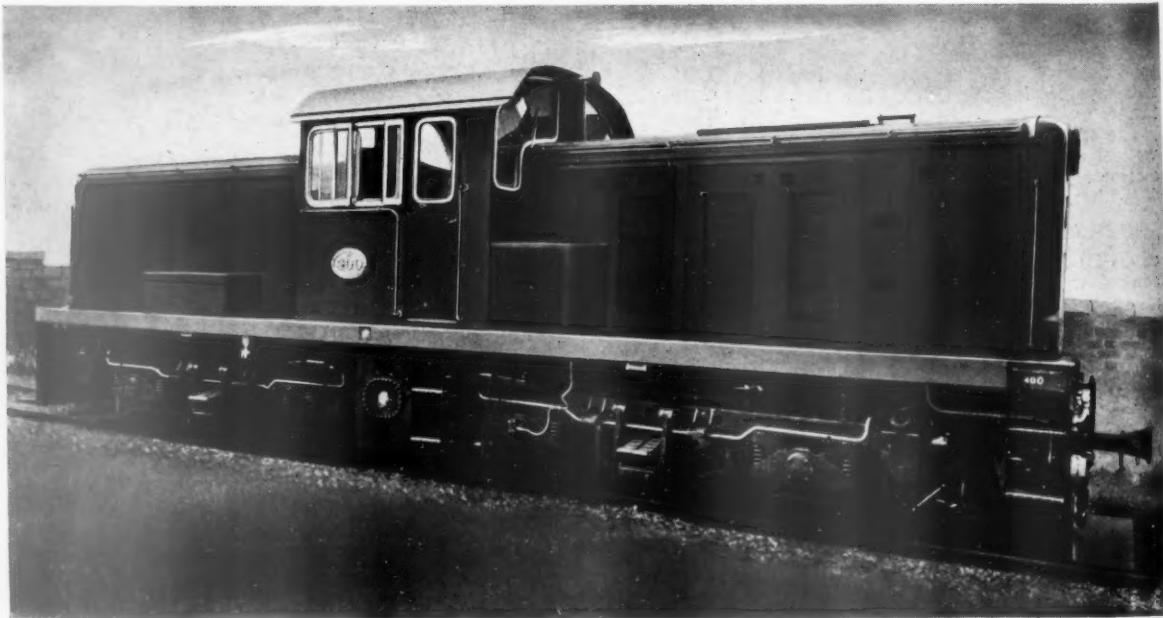
Fuel oil is stored outside the sheds in

six 7,000 gal. horizontal cylindrical tanks. At the consumption rate of 10,000 gal. per week, the total storage capacity is sufficient for one month's supply.

Contractors for the modernisation work include:—

Structural work including platforms	Harbour & General Works Limited
Electrical contractors . . .	Bectice Electrical Co. Ltd.
Battery charger . . .	Legg (Industries) Limited
Fuelling installation . . .	Wayne Tank & Pump Co. Ltd.
Industrial vacuum cleaners . . .	Sturtevant Engineering Co. Ltd.
Portable lubricating dispensers . . .	Wakefield-Dick Industrial Oils Limited
Water treatment plant . . .	Permutit Co. Ltd.

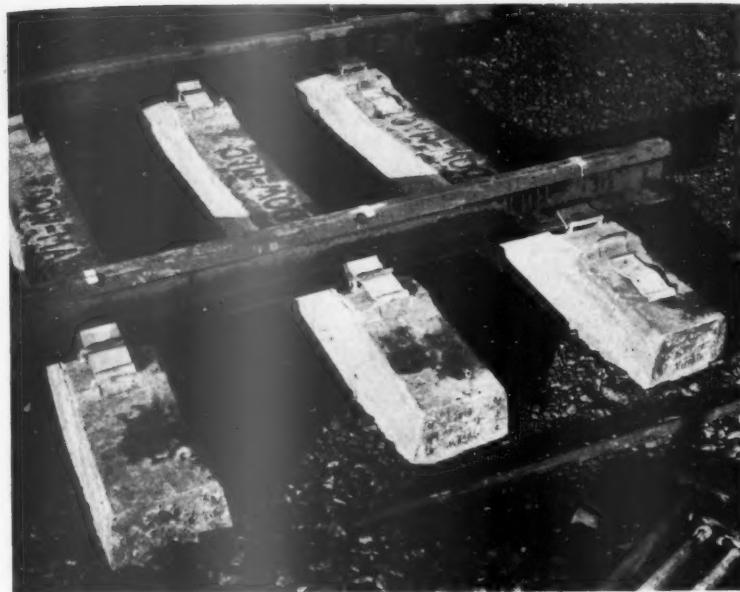
Diesel-Electric Goods Locomotives for New Zealand



Bo-Bo diesel-electric locomotive built by the British Thomson-Houston Co. Ltd., for the New Zealand Government Railways. One of these will be shown at the A.S.E.E. Exhibition at Earls Court on March 17-21 (see editorial comment on page 263)

Fastening Flat-Bottom Rails on Concrete Sleepers

Tests with Skull Hoop Clip fastening in Western Region



Assembly of Skull Hoop Clip fastening, showing steel hoops and resilient steel clips

BRITISH Railways are still seeking the best design for fastening flat-bottom rails to pre-stressed concrete sleepers. Many assemblies have been considered, and few so far have satisfied all requirements. Some have failed in the stringent laboratory tests, and others have proved unsatisfactory in subsequent track trials. Amongst other requirements, the fastenings must

be simple and inexpensive, easily installed and removed, give adequate track-circuiting insulation, and be suitable for use with long-welded rails.

The assembly of the Skull Hoop Clip fastening, developed by the Tempered Spring Co. Ltd., follows an idea submitted by a member of the technical staff of the Chief Civil Engineer's Department of the Western Region.

The development of the sleeper moulds and the manufacture of the concrete sleepers to suit the design of the fastenings was carried out by Dow-Mac (Products) Limited.

The fastening consists essentially of two steel hoops cast into a Class "F" concrete sleeper each side of the rail seat, and two resilient spring steel clips. The horizontal bars of the hoops are so arranged and the clip so designed that the clip when driven between the horizontal bars exerts a downward pressure on the bottom flange of the rail, so as to give a two-point bearing on the rail when fully inserted.

Insulation of the assembly is provided by a rubber rail pad and two insulators to fit between the rail flange, the vertical bars of the hoops, and the spring clips.

The rubber rail pad is of a pimple pattern designed and developed specially by the Tempered Spring Co. Ltd. for use with this fastening.

The insulators are manufactured from a resin-bonded laminated fabric material by Tufnol Limited. A material was found necessary which had not only high electrical insulation properties, but also high mechanical strength to withstand the pressure exerted by the clip and the side-thrusting from the rail that would be experienced in curved track under traffic.

Assembling of Fastening

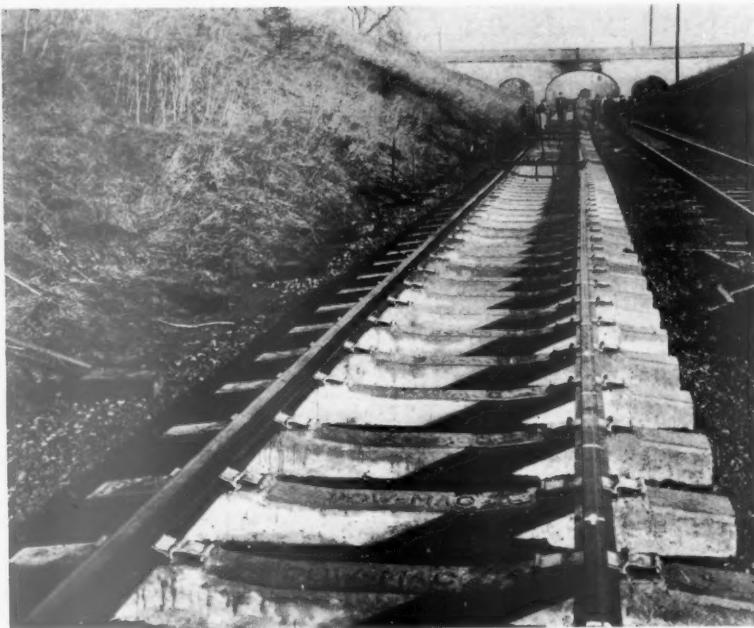
The assembling of the fastening is simple, and no special tools are required. The clip is driven laterally on to the foot of the rail by means of a standard keying type hammer, and can be extracted easily by using a standard



Lever mounted on trolley for lifting sleeper hard up to bottom of rail to allow insertion of insulators and clips



Sleeper lifted by one man with lever device shown in left-hand illustration, during re-laying at Chippenham



Pair of long rails laid and fastened with Skull Hoop Clip during re-laying at Chippenham

slewing bar as a lever against the toe of the clip and using the rail head as a fulcrum.

Laboratory Tests

Tests were carried out in the Western Region Civil Engineering Laboratory. They included torsion, creep, and moment of resistance tests. The results showed an efficiency superior to that of most other fastenings tested in the same manner.

It was appreciated from the laboratory tests that, for easy assembly and driving of the clip, it was necessary to have the rail sitting properly on its rubber pad on the sleeper. It was realised also that this seldom occurred in a re-laying operation because of uneven surface of the ballast, though this is counteracted as far as practicable by scarifying and subsequent vibration rolling.

Lifting Sleeper Hard up to Rail

In such conditions there would be a gap between the underside of the flat-bottom rail and the top of the rubber pad which would prevent the insertion of the clip. To overcome this problem the appliance illustrated on page 275 was developed. This consisted of a lever mounted on a trolley with chains and grapple irons at one end for placing round the middle of the sleeper. By this means it was possible for one man to lift the sleeper hard up to the bottom of the rail and thus allow the insertion of the insulators and clips.

Continuous Welded Rails

For the test length of re-laying using continuous welded rails, a length of 826 yd. was selected in the up line of the main Paddington to Bristol route,

between Chippenham and Langley Crossing. The site is situated on a falling gradient of 1 in 660 in straight track carrying fairly heavy mixed freight and passenger trains. Maximum speeds attainable over the length are about 65-70 m.p.h.

Re-laying of this length was carried out on December 14, 1958, and involved the taking up of existing 60-ft. B.S.95 rails on early Dow-Mac type pre-stressed concrete sleepers and the laying in of three pairs of 60-ft. rails,

and seven pairs of 300-ft. flash-butt-welded 109 f.b. rails on hoop-type pre-stressed concrete sleepers laid at 25 sleepers per 60-ft. length of rail, with two pairs of adjustment switches.

Thermite welding of the 300-ft. long rails into a continuous length between the adjustment switches was carried out during night occupations of the line after completion of the re-laying operation.

A pair of long rails laid and fastened down during the re-laying work, and a general view of the length after completion of the re-laying are illustrated on this page.

Although, because of a supply of faulty steel, some clips have broken since the laying in of the test length near Chippenham, it is proposed to install additional lengths of track in the Region, using the hoop type concrete sleeper and fastenings, during the current year.

Advantages of S.H.C. Fastening

Besides a superior holding-down efficiency compared with a number of other types of fastenings, several other advantages are claimed for the S.H.C. fastening. The main features in its favour are simplicity of design, ease of assembly, and extraction of the clip without the need for specially designed tools.

Another important advantage is the method of insulation, which the Signal Engineer, Western Region, is prepared to accept for limited experimental use in track-circuited areas.

It is also expected that very little maintenance will be required on this fastening, and that if produced in large numbers, the concrete sleepers and fastenings will be as cheap as any which are suitable for use on British Railways.



After completion of re-laying of length shown in upper illustration

RAILWAY NEWS SECTION

PERSONAL

Mr. D. F. Purves has been appointed Chief of Development, Department of Research & Development, Canadian National Railways. He succeeds Mr. H. A. Wood, who is retiring.

Mr. L. J. Boucher, M.I.R.S.E., Signal Engineer, Southern Region, British Railways, who, as recorded in our February 13

Mr. R. A. Smeddle, Chief Mechanical & Electrical Engineer, Western Region, British Railways, has been elected President of the Institution of Locomotive Engineers for the 1959-60 session.

Mr. J. F. H. Tyler, M.I.R.S.E., Assistant Signal Engineering Officer, British Railways, Central Staff, who, as recorded in our February 13 issue, has been appointed Signal Engineer, Southern Region, British

formation of the Chief Engineer's office, became Assistant (Signals). Mr. Tyler joined the Great Western Railway as Assistant to the Signal & Telegraph Engineer, in 1947, and became Assistant Signal Engineer in 1952. In 1957, he was appointed Assistant Signal Engineering Officer, B.T.C. Headquarters, the position he now vacates. He was a part-time lecturer in telecommunications at Enfield Technical College, 1942 to 1947. He was



Mr. L. J. Boucher
Signal Engineer, Southern Region,
who is retiring



Photo: [Elliott & Fry]
Mr. J. F. H. Tyler
Appointed Signal Engineer,
Southern Region

issue, is retiring, joined the Signal Department, New Cross Gate, London, Brighton & South Coast Railway, in 1913. On the amalgamation, in 1923, was transferred to Wimbledon, where he was connected closely with the many and extensive colour light signalling installations of the Southern Railway. In 1929, Mr. Boucher became Assistant for New Works, and, at the beginning of 1939, was appointed First Assistant (Power, Signalling & General). He was made Chief Assistant to Colonel G. L. Hall, then Assistant Engineer (Signals & Telegraphs) in 1940, and when, in 1944, Colonel Hall was re-designated Signal Engineer, Mr. Boucher was re-designated Assistant Signal Engineer, an appointment which he held until February, 1947, when he became Signal Engineer of the Southern Railway, and subsequently of the Southern Region, British Railways.

Sir George Seel, Senior Crown Agent for Oversea Governments & Administrations, is retiring at the end of this month.

Railways, began his career in the Signal & Telegraph Department, Southern Railway, in 1925. After a period in the shops and on general signalling work, in the Drawing Office, he was engaged on the multiple-aspect resignalling schemes between Coulsdon and Brighton, and between Waterloo and Hampton Court Junction. In 1935, he joined the Signal Department, London Passenger Transport Board, and was associated with resignalling at Cromwell Curve, Northern City Line and Neasden before leaving, in 1937, to join the staff of the Signal & Telegraph Engineer, London & North Eastern Railway (Southern Area), where he was responsible for planning the multiple-aspect signalling in connection with the Liverpool Street-Shenfield and Manchester-Sheffield-Wath electrification schemes. He also was responsible for the planning and installation of the first sequence switch interlocking at Doncaster, until all major new works were suspended during the 1939-45 war. In 1942, he became Assistant (General) and, on the

also British Railways' Representative for Signalling & Telecommunications at the U.I.C. meetings from 1947 to 1949 and since 1957. Mr. Tyler has been a member of Council of the Institution of Railway Signal Engineers since 1946, and is President of the Institution this year.

Mr. W. M. C. Scott, Stationmaster, Glasgow Central, Scottish Region, British Railways, will retire on March 21.

Mr. W. H. McFadzean, Industrial Leader & Vice-Chairman of the Advisory Council on Middle East Trade is retiring temporarily from this position, at his own request, on becoming President-Elect of the Federation of British Industries. During his term of office with the F.B.I. Mr. H. G. Nelson, Managing Director, English Electric Co. Ltd., will take over as Industrial Leader & Vice-Chairman of the Council. Mr. Nelson is at present making an extensive tour of India, Pakistan, Ceylon and the Middle East.



Mr. D. S. Hart

Appointed Operating Officer, Birmingham,
Western Region



Mr. C. L. Newbury

Appointed Staff Assistant, Bristol,
Western Region



Mr. J. J. Donovan

Appointed Staff Assistant, Birmingham,
Western Region

Mr. D. S. Hart, O.B.E., E.R.D., District Passenger Manager, Birmingham, London Midland and Western Regions, British Railways, who, as recorded in our January 2 issue, has been appointed Operating Officer, Divisional Traffic Manager's Office, Birmingham, Western Region, joined the Great Western Railway as a booking clerk in 1923. He was transferred to the Office of the Divisional Superintendent, Worcester, in 1929, and, in 1938, joined the Staff of the Divisional Superintendent Paddington. He was called up as an officer in the Supplementary Reserve, Royal Engineers, and served in a Railway Operating unit in France, in 1939. He subsequently became a staff officer, in the Middle East, and in G.H.Q., India, before being appointed Assistant Director of Transportation, Persia. In 1943 he joined the Planning Staff for the Invasion of Normandy and, on demobilisation, was in charge of the Hamburg Division, German Railways, with the rank of Colonel. Mr. Hart was appointed Junior Assistant to the Divisional Superintendent at Birmingham in 1947. He was Acting Chief Clerk in Birmingham and Assistant District Traffic Manager, Oswestry, before being appointed Assistant to the District Operating Superintendent at Bristol in 1950. He returned to Oswestry, as Assistant District Traffic Manager, in 1952, and was made Chairman of the Working Committee formulating the Steam, Interval Service for the Birmingham District in 1954. After studying railway working in the Netherlands, during the winter of 1955-56, Mr. Hart was appointed Assistant District Operating Superintendent, Birmingham (Snow Hill), Western Region, in 1956. In January, 1957, he became District Passenger Manager for the London Midland and Western Regions at Birmingham. Mr. Hart was a British Transport Commission nominee to the Transport Users' Consultative Committee for the West Midland Area, and a member of the Standing Joint Committee with the Birmingham & Midland Red Omnibus Company.

Crompton Parkinson Limited has announced that Mr. A. E. Gregg has been appointed General Manager, F. & A. Parkinson Limited, Guiseley.

Mr. C. L. Newbury, A.M.Inst.T., Assistant District Commercial Manager, Swansea, Western Region, British Railways, who as recorded in our January 2 issue has been appointed Staff Assistant, Divisional Traffic Manager's Office, Bristol, joined the Great Western Railway at Plymouth in 1922. He transferred to the Chief Goods Manager's Office, Paddington, in 1934. Eighteen months later he entered the General Manager's Staff Department and was concerned with the rates of pay and conditions of service of staff. Early in the 1939-45 war, he returned to the Chief Goods Manager's Staff Department, and was responsible for the staffing arrangements throughout the Goods Department. In 1946 he was appointed an outdoor representative in the Road Transport Control. In 1951 he was appointed Leader of a Special Staff Investigation Committee, covering the Western Region, and, two years later, was transferred to Swansea, as Chief Clerk to the District Commercial Manager. He was appointed Goods Agent Swansea, in April, 1956, and 15 months later, became Assistant District Commercial Manager, Swansea. Since 1955, Mr. Newbury has been a member of the Swansea Local Productivity Committee.

Mr. E. J. Vidler, Director & General Manager of W. T. Henley's Telegraph Works Co. Ltd., has been elected Chairman of the Cable Makers' Association.

Mr. E. J. H. Hewetson has been appointed representative, in the Yorkshire Area, of the Hydraulic Equipment Section, Chamberlain Industries Limited. His address is 9, Roger Drive, Sandal, Wakefield. Telephone Wakefield 5514.

Mr. S. G. Gates, Chairman, and Mr. P. R. Scutt, Managing Director of Tecalemit Limited will join the board of British Filters Limited. Mr. T. E. Worth, at present Chairman & Technical Director, will continue in that capacity, together with Mr. Nigel J. Bennett, who will continue as Managing Director. The purchase of half the ordinary shares in British Filters Limited is referred to in our issue of last week.

Mr. J. J. Donovan, who, as recorded in our January 2 issue, has been appointed Staff Assistant, in the Divisional Traffic Manager's Office, Birmingham, Western Region, British Railways, joined the Great Western Railway at Basingstoke in 1929. He served at that station, in the Traffic Department, until 1932, when he was allocated to relief duties in the Newbury-Reading area. A year later he was transferred to Winchester, continuing area relief duties as necessary. In 1939 he was moved to Bramley in connection with the increased activities of the Central Ammunition Depot. In 1940 he enlisted in the Irish Guards, and served in North Africa and Italy. In February, 1944, he was taken prisoner of war at Anzio. Repatriated, in May, 1945, and demobilised January, 1946, he resumed his railway service at Reading and was transferred to the District Operating Superintendent's Office at Paddington in 1947. He moved to the District Goods Manager's Office, Reading, in 1949, and, in 1951, returned to Paddington for Special staff investigation duties. He conducted investigations throughout the Region, and, in March, 1956, became associated with the mechanisation of office work under the Modernisation Plan.

Lord Chandos, Chairman of Associated Electrical Industries, has completed a five-week tour of Latin America where he had talks with Presidents, Ministers of Finance and Economy, and Bankers in Brazil, Venezuela, Argentina, Chile, Mexico and Peru.

The Earl of Halsbury has been invited by the Directors of Lancashire Dynamo Holdings Limited to join the board as Vice-Chairman in April, by which date he will have relinquished his appointment with the National Research Development Corporation.

Mr. George Taylor and Mr. John D. Eccles have been appointed directors of Head Wrightson Steel Foundries Limited. Mr. Roger B. W. Bolland has been appointed a director of Head Wrightson Colliery Engineering Limited and Mr. Richard O'Brien a director of Head Wrightson Stockton Forge Limited.



Mr. F. D. M. Harding

Appointed Managing Director of the Pullman Car Co. Ltd.

Mr. F. D. M. Harding, O.B.E., General Manager of the Pullman Car Co. Ltd., who, as recorded in our January 13 issue, has been elected to the board of that company, will be Managing Director. Mr. Harding served throughout the 1914-18 war in the Highland Light Infantry, and on demobilisation went up to Oxford. He served with the R.A.O.C. in the 1939-45 war, in Gibraltar, North Africa, Italy and Greece, and joined the Pullman Car Co. Ltd. in November, 1945. He succeeded Mr. Griffiths as General Manager in December of that year. No regular Pullman services were then in operation. Sixty per cent of the cars had suffered damage from enemy action, and the whole fleet needed heavy overhaul. This was completed in time for the re-introduction of the Golden Arrow Continental boat-train service in April, 1946, and by the end of 1947 all the services on both the Southern Railway and L.N.E.R. were again in operation.

Mr. R. M. Taylor has been appointed Chairman of Richard Costain (Africa) Limited.

At a recent ceremony, Mr. A. R. Dunbar, O.B.E., former Assistant General Manager, North Eastern Region, British Railways, now Manpower Adviser, British Transport Commission, was presented with a cigarette lighter, the gift of the members of the Committee of the North Eastern Region Cottage Homes & Benefits Fund, of which he was Chairman for three years. Founded in 1919, the fund has built 410 Cottage Homes and has given financial help to members of the staff in difficult circumstances. The photograph, reproduced on this page, shows (left to right), the members of the Committee taken on the occasion of the presentation:—Mr. C. L. Smith, Estate & Rating Surveyor; Miss M. Luxmore, Personal Clerk to Secretary; Messrs. J. Hetherington, T. Ellis, L. Smith, D. Reeves and W. Hustwick (Members) Mr. H. Clayden, Secretary, Railway Cottage Homes; Mr. H. A. Short, General Manager, North Eastern Region; Mr. A. R. Dunbar; Messrs. H. Fell, A. G. Grosert, T. Yellowley and W. Grumbley (Members).

Mr. Seymour Dribben has been elected to the board of Cummins Engine Co. Inc.

Mr. S. H. Oliver has been appointed Assistant Manager of the Purchasing Department, Wakefield Castrol Group.

Mr. W. Fraser, Scottish Cables Limited, has been elected Chairman of the Scottish Council of the Federation of British Industries, in succession to Mr. Colin MacKenzie, J. & P. Coates Limited.

THE LATE MR. W. R. ROBERTSON

A Requiem Mass for the late Mr. W. R. Robertson, Public Relations Officer, London Transport Executive, was celebrated at St. Bartholomew's Roman Catholic Church, Norbury, on February 26, followed by interment at Streatham Park Cemetery. In addition to family mourners, the following were among those present: *London Transport Executive*

Messrs. Anthony Bull, B. H. Harbour, A. G. Evershed, G. Ferryhough, F. G. Maxwell, R. M. Robbins, H. F. C. Adcock, H. W. Brooksbank, G. J. Dickins, J. Fairlee, J. R. Garwood, J. H. Giffin, H. T. Hutchings, H. F. Hutchison, F. J. Lloyd, C. A. Lyon, C. J. Mays, A. R. Purves, G. P. Stuart Clark, K. R. Thomas, A. T. Wilford, F. E. Wilkins, and F. D. Rose.

The congregation also included representatives of the Road Services Uniform Staff, Public Relations and Travel Enquiry Offices, and other members of London Transport Executive Head Offices.

British Transport Commission

Mr. G. Dodson Wells.

Eastern Region, British Railways

Mr. G. W. Brimyard

London Midland Region, British Railways

Mr. G. Murrell

Southern Region, British Railways

Mr. D. McKenna and Mr. F. D. Y. Faulkner.

Western Region, British Railways

Mr. C. J. Rider

Others present

Mr. J. E. Toole, London County Council; Mr. S. W. Barker, Deputy Town Clerk, Barking.

The late Mr. Robertson was the Public Relations Officer of the London Transport Executive from 1948 to 1959, and not 1950, as shown in the caption to his picture appearing in our issue of last week. This was due to a printers error.



Mr. E. J. Morris

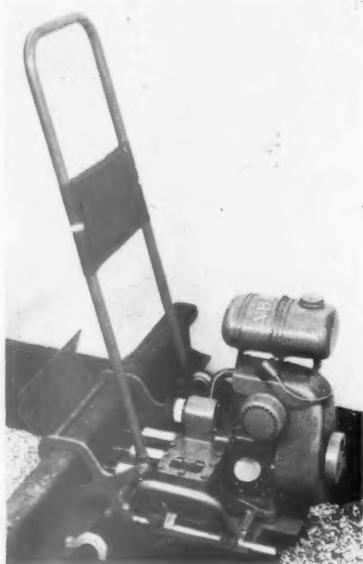
Elected a director of the Pullman Car Co. Ltd.

Mr. E. J. Morris, M.Inst.T., who, as recorded in our February 13 issue, has been elected to the board of the Pullman Car Co. Ltd., received his business education at the Regent Street Polytechnic. Mr. Morris joined the Pullman Car Co. Ltd. in 1920, being appointed Assistant Accountant in 1927, and Assistant Secretary & Accountant in 1929. He formed and administered Irish Pullmans Limited, which operated Pullman cars from Dublin to Limerick, Cork and Sligo, finally acting as liquidator of this subsidiary company at the end of the contract, in 1937. He was appointed Acting Secretary & Accountant, in 1939, and confirmed in that position in 1940. During the 1939-45 war, Mr. Morris was seconded to the Chief Accountant's Office, Southern Railway, and in that period he also continued to administer such restricted services as the company was called upon to operate by the Southern Railway. Mr. Morris retains his position of Secretary & Accountant of the company.



Mr. A. R. Dunbar, with North Eastern Region Cottage Homes & Benefits Fund Committee, after the presentation (see accompanying paragraph)

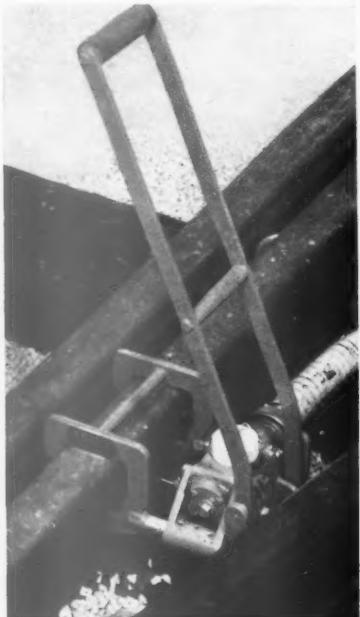
NEW EQUIPMENT AND PROCESSES



Multi-Spindle Drilling Machine

A TRIPLE-spindle power-operated bond-drilling machine has been developed for signal engineers which simultaneously and in 30-sec. drills three $\frac{3}{16}$ -in. dia. holes at 3-in. centres. The first illustration on this page shows the machine in position with the wire guard raised to show the drilling spindles. This guard is lowered during drilling operations.

The machine, which is placed easily and quickly in position, was designed for use on standard flat-bottomed and bull-head rails as used by British Railways. It is available also for use on other types of rail (overseas).



Drilling is performed by pulling lightly on the application lever toward the operator or, from the other side of the rail, by lever-pressure away from the operator. The three chucks are adjustable to permit a full-length drill to be used together with bits shortened by re-sharpening. Easy transit is facilitated by a detachable undercarriage or two double-flange rollers incorporated in the undercarriage axle. These permit the machine to be scooted along one rail.

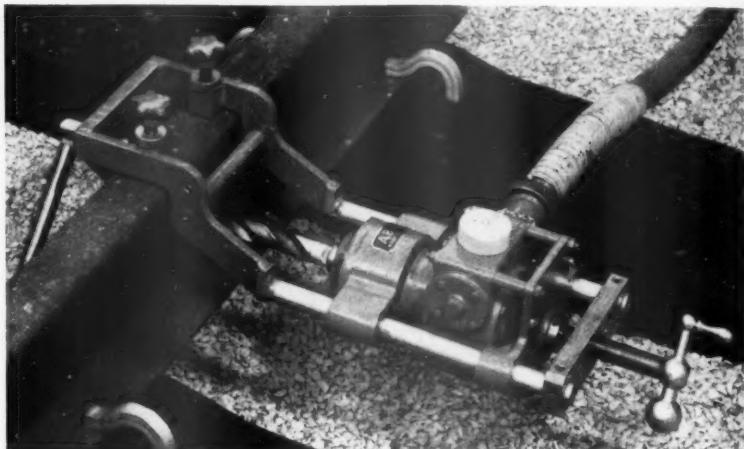
A power take-off coupling enables the machine to drive by flexible shaft two ancillary units. These are: (1) Points and crossing unit for drilling single $\frac{3}{16}$ -in. dia. holes. Operable within a space of 7 in. between converging rails. (2) Single-spindle unit for drilling holes up to 1 in. in dia. Also available is a grinding wheel and spindle connected direct to the power take-off coupling on the main bond-drilling machine. This attachment permits resharpening of bits on site.

The machine was especially designed for the Signal Engineer, Eastern Region,



posed and the unit so designed that any tendency to vortex formation automatically is counteracted.

The partial use of plastic for the con-



British Railways and several are in use on that Region. Others are in use on the Scottish Region and will be employed by the London Midland Region in the near future.

Further details can be obtained from the manufacturer, Abtus Limited, Vandon Court, Petty France, London, S.W.1.

Permanently Locked Studs

WE regret that a copying error was introduced into last week's account of the Rosan permanently locked studs and inserts. The first sentence should have read: "Designed to facilitate firm attachment of a component to a lightweight metal casting of magnesium or magnesium alloy . . ."

Floating Suction Strainer

THE Dolphin floating suction strainer, on which world patents are granted or pending, has been designed to overcome specific problems commonly met with while de-watering.

Entry holes have been cylindrically dis-

tructed in the unit to combat the tendency of the heavier type of strainer to sink, draw in fine solids, get buried and consequently to produce cavitation erosion.

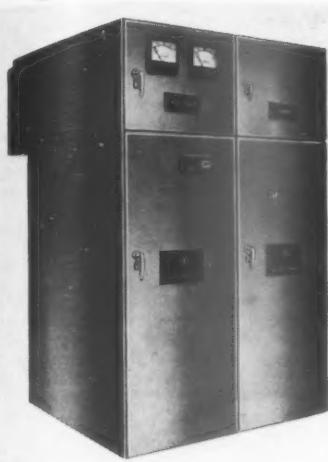
It is claimed that correct analysis of the balance and buoyancy of the parts of the unit, and the rotatability of the tube to which the hose directly is attached, maintain the strainer in its correct position despite any twisting of the hose which may occur. An internal moulding of expanded polystyrene foam safeguards buoyancy in the event of accidental damage.

It further is claimed that the unit is particularly suited to working under "snore" conditions.

The entire strainer is constructed from plastic and austenitic stainless steel and accordingly is practically immune to corrosion. It is able to withstand very rough handling and its shape and freedom from projections make it particularly suitable for working on the end of a hose.

It is made for 1½-in., 2-in., 3-in., and 4-in. hoses. Delivery up to two months, according to size required.

Further details can be obtained from the manufacturer, Megator Pumps & Compressors Limited, 43, Berkeley Square, London, W.1.



Circuit Breaker and Oil Switch Unit

A NEW air-insulated 11 kV. 250 MVA. circuit breaker unit and an 11 kV. 250 MVA. oil switch have been developed.

Although the circuit breaker has a width of only 24 in., all parts are easily accessible for maintenance. Rated at 400 A., it is truck-mounted and vertically isolated by hand-operated "single" screw mechanism.

High-pressure contacts have a parallel wiping action to ensure long life. The contact assembly is oil-immersed in a steel tank divided into three interphase compartments, each lined with Elephantite. The "butt and wipe" auxiliary plugs are heavily silver-plated. Individually-sealed busbar and current transformer chambers are of rigid steel plate. A new brand of Tufnol with an Epoxy resin base is moulded separately on each air-insulated, 1,200 A. busbar.

Current transformers are air-insulated and encapsulated. The voltage transformer can be isolated from ground level. Isolating sockets are automatically screened in "isolated" position. Closure can be manual, remote, or powered.

Safety precautions prevent closure except when correctly located; isolation when contacts are closed; withdrawal before complete isolation, and raising to service position unless the oil tank is bolted in position. When the circuit breaker is lowered, the live isolating plugs are screened automatically by shutters positively driven in both directions.

The oil switch "makes" at 250 MKV. and "breaks" at 400 A. It is manually-operated, both "making" and "breaking" being independent of operator. Blade-type high-pressure line contacts give a single break per phase.

Interlocking ensures equality of angles of movement and immovability of the isolator between "on" and "earth." The switch can be locked in any of the three positions. Plug-in test-sticks can be incorporated in a triple-pole unit capable of carrying 200 A. continuously.

Interlocked, the switch must be in "earth" position before test sockets can be exposed and until test sticks are inserted. Interlocking ensures that the claws holding the test stick cannot be moved.

Further details can be obtained from the manufacturer, George Ellison Limited, Perry Barr, Birmingham 22B.

Key Control

COLORCAPS constitute a new system for filing and control of keys. The system, which is based on visual selection, is extremely clear and adaptable, and is available in boards or cabinets.

The caps, which are made in eight bright and contrasting colours, are of durable rubber composition. They stretch easily and fit all usual types of lever and cylinder lock keys. The beak-shape indicator shows instantly which way the key should be inserted. The various colours can indicate groups, floors or departments.

Interchangeable, clearly-read index tabs correspond with numbered adjustable key hooks. These take two keys each.

Location cards show the absence of a key, which one, who took it, and when.

Each board and cabinet, strongly made in steel, is supplied with a visible index. Cabinets can be fixed or built to the wall. The largest cabinet has a separate, independently-locked internal security compartment for special keys and duplicates.

Boards are made in two sizes, to hold 14 and 40-50 keys. Prices in the United Kingdom range from £9 8s. complete, inclusive of purchase tax. Cabinets are manufactured to hold 50, 140, and 280-300 keys. Cost is from £19 8s. complete, inclusive of purchase tax.

A Swiss invention, Colorcaps are distributed in the United Kingdom and British Commonwealth by Inter-Continental Office Equipment Limited, Vivian Road, Birmingham 17, from which company further details can be obtained.

Wheel-Mounted Welding Set

CLAIMED to be the largest single-operator wheel-mounted a.c. welding set available, the O.T.2 unit provides a maximum intermittent welding current output of 700A. at 80V. Welding current output is from 120 to 700A. in 25 steps, with a continuous manual welding current rating of 650A. Rated at 52 kVA., in accordance with B.S.638 group Y, it consists of an oil-immersed single-phase transformer and separate choke enclosed in a fabricated sheet-steel tank which also can



contain a 20 kVA. resistance air-cooled capacitor inside a separate compartment.

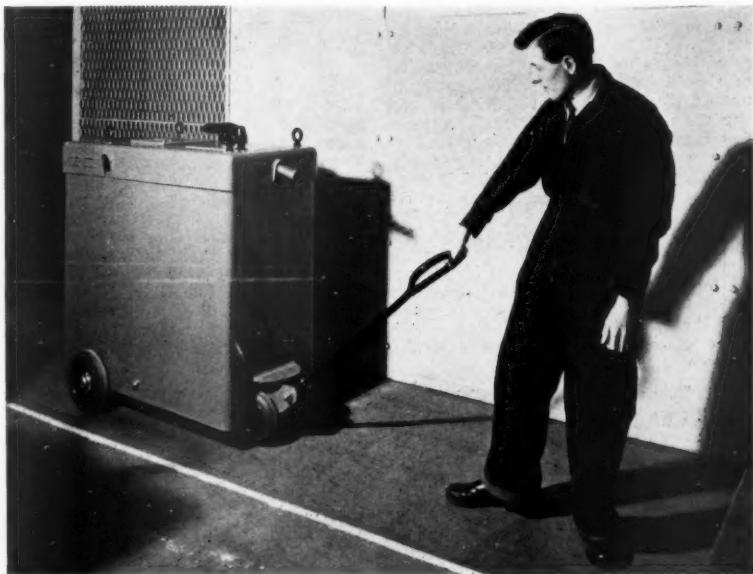
Regulating handles for coarse and fine current adjustments control the welding current. Primary transformer tappings are brought to a terminal board immediately beneath a small lid on the top cover and provide for a primary voltage range from 380 to 550V. in three steps.

Full instructions for making the correct primary transformer connections and for obtaining the required welding current are given on prominent diagram plates mounted on the top cover.

The components and windings are securely braced to prevent any possibility of movement even under the rough handling which gear of this type is likely to receive in service.

The whole unit is mounted on four rubber-tyre wheels.

Further details can be obtained from the manufacturer, the General Electric Co. Ltd., Kingsway, London, W.C.2.



National Importance of Locomotive Exports

*President of Board of Trade's address
to Institution of Locomotive Engineers*

The annual luncheon of the Institution of Locomotive Engineers was held at the Dorchester Hotel, London, W.1, on Friday last. Mr. R. Arbuthnott, the President, was in the chair, and the principal guest was Sir David Eccles, M.P., President of the Board of Trade, who proposed the toast of "The Institution."

Sir David Eccles, in the course of his speech, said: "From the point of view of the Board of Trade, what we really want to know is whether the British Transport Commission is a help or a handicap to the sale of railway equipment overseas. We have a right to ask, and I will tell you why, with Sir Brian Robertson right alongside me. A very large sum of taxpayers' money is going into the British Transport Commission, quite rightly, to modernise the railways. Nobody thinks that the programme is more needed than I do.

"But how is it that we are able to undertake great capital programmes in this country, generating, as they do, a large amount of purchasing power, which has an immediate impact upon the balance of payments? The workers concerned ask for imports. We can only do it if we can keep the £ strong, and we can only keep the £ strong if we have a healthy export trade. The British Transport Commission has just as much a stake in the export trade as any of you have, because we shall soon cut down our programme if exports and the balance of payments go wrong.

Buyers' Questions

"It seems to me that this is what a locomotive buyer from overseas would say. 'It looks very nice what you are selling us, but have you ever used it at home? Can we see it in operation? Who has proved the worth of this equipment?'

"What I want to know is, because of the position which the British Transport Commission has inherited—namely, as a big manufacturer with a big engineering works—whether it is helping us as much as it should in the export world. I am told by everybody that it is all very much better because Sir Brian Robertson is a clever fellow and he understands all these things, but it is very important that we should have at least the capacity to prove a piece of equipment at home and then use that advertising to sell it abroad. You cannot just go out of this country and say 'This machine runs, or this aircraft flies, but no one has tried it out.' You have a prejudice against it if you do.

"It is easy for the man who manufactures locomotives in the United States. He simply telephones the president of some United States railway and gets him to use the lot, and then he gets a pat on the back. He gets a gratuitous advertisement from the United States railway when he is trying to sell the same machine to Mexico or elsewhere.

Fair Competition Essential

"All I want to say is that we should be able to compete fairly in that field. Either let the Transport Commission make railway equipment and itself sell it abroad—I do not know whether that is right in terms of the Act—or let the manufacturer do it. What I do not want is that we should do neither one thing nor the other—that is to say, neither the British Trans-

port Commission proving the equipment, nor helping the private manufacturer. What would not be right for the United Kingdom would be to have a nationalised railway system at home and by that deprive ourselves of the push and the advertising material that is necessary to sell our things abroad. We must do one thing or the other. I think you will agree with me there.

"I leave it with people who understand these things more than I do as to which line is the right one on which to go forward, but do not fall between the two stools. If you want to have big orders in this country and a big industrial advance in this country, you cannot get it unless we have enough exports. If we cannot maintain our balance of payments, we will have to cut down the rate of expansion at home.

Export Credits

"I have just one other thing to say from the Board of Trade point of view. It concerns credit for the sale of railway equipment abroad. This is a very difficult subject, because I think the Americans, with their Export-Import Bank, have a tender spot for locomotives. They manage their export credits in a different way to what we do. In this country, we as a Government insure credit. We do not provide it except under Section 3 of the Act, which is a rare instrument to use.

"We think—and, I am sure, rightly—that in this country we have a banking mechanism which is a good one, that it does not require a national banking institution to lend money for the export of capital goods and that provided we insure the finance which is found through the ordinary channels of banking, we have the best possible system.

"The question then is, do the terms on which we insure credits match up to those of your rivals? Everyone who has ever lost an order because, they say, some foreign country has given seven or ten years' credit, or whatever it is, beyond the limit to which the Export Credits Guarantee Department will go, says that we all ought to follow after the member of the Credit Insurance International Club who has broken the rules.

"It is obviously not in the interests of this country to engage in credit races. We have a greater stake in the export market as a whole being conducted on reasonable commercial lines without an element of subsidy than any other country in the world.

"We have made an exception for four-engine civil jet aircraft in particular, because the Export/Import Bank started the race, and it is only vis-à-vis the Americans that we are in competition with four-engine aircraft of this kind. I have quite deliberately made an exception and I followed and have matched the credit terms which the Americans give.

"If there is a case for doing that on locomotives, and you want to put the case to us, I am quite willing to look at it, but I must be really convinced that it is a case which holds water and which will not lead us along the slippery slope of giving everybody, everywhere, extended terms of credit which, in the end, would react against the interests of this country. I say that to you because I know that some of you are worrying about this payment business, but I want to see the case really

documented. If you will do that, I give you an assurance that I will look at it."

The President, who responded, said that this country had been first in the field with the locomotive and friends overseas still looked to Britain for guidance in railway matters, not from any sense of inferiority, but from a sense of mutual friendship and a desire to benefit from our long experience. If we were to continue to play the part which was expected of us in these changing days, we had not only to keep up to date, but in the lead. He believed that with the locomotives, diesel and electric, which British industry was now producing, we could do just that.

Importance of Industry

The locomotive industry had played an important part in equipping the railways of the world, and it could go on doing so; but to do this most effectively, as Sir David Eccles had said, it needed the co-operation of British Railways so as to give it a permanent basic load of work and, at the same time, to enable practical demonstrations to be given here. It could also ensure that there was a training ground for students from overseas to supplement the workshop training which industry can give.

Mr. R. C. Bond, Past President, who proposed the toast of the Guests, said he thought it would be conceded generally that the British Transport Commission was helping, to an extent more than ever before, the locomotive industry of this country. Under the guidance and leadership of Sir Brian Robertson there has been an entirely new spirit abroad.

Large orders for locomotives had been placed and there had been set up a joint technical committee between the manufacturers and B.T.C., from which they hoped and expected very considerable results. The experience gained from new locomotives would be available for those to be built and sent overseas; and, equally, it was hoped and expected to receive much useful information from experience gained on overseas railways.

Sir George Seel, the Senior Crown Agent, who responded, said that in the course of the Institution's history of nearly fifty years, the Crown Agents had twice provided a President. One was a Major Williams, who had been President in 1833, and the other Mr. Archibald Campbell.

The President then introduced Mr. R. A. Smeddle, the President-Elect for the next session.

Among those present were:

Messrs. E. A. Adams, H. W. Adams, W. M. Adey, L. B. Alexander, Abdulmaliki Alhaji, E. L. Allen, W. F. Allen, C. G. Anderson, I. L. Anderson, B. W. Anwell, H. J. S. Arbuthnott, R. Arbuthnott (President), J. Clubley Armstrong, R. I. D. Arthurton, His Excellency Asafu-Adjaye,

Messrs. G. A. Ashton, M. Ashiq, L. V. Athron, R. M. Atkinson, V. Atkinson, C. S. Austen,

Messrs. E. H. Baker, J. Baker, S. E. Baker, D. Ball, E. B. Banks, S. Barber, D. Barnden, J. L. Barnes, R. Barr, G. M. Barrett, D. S. M. Barrie, T. W. Barrow, G. J. Barton, H. H. C. Barton, A. Bates, A. E. Bates, H. Bayley, N. Beachy, J. Beasley, J. E. Beckett, R. A. Beckett, J. E. Bell, H. Bennett, J. P. Bennett, G. F. E. Best, G. S. Bingham, G. H. Binnie,

C. I. Birkbeck, J. Biro, R. W. Black, C. N. Blakeney, G. H. E. Bond, R. C. Bond, G. W. Bone, N. Booth, E. T. Bostock, J. Bowers, H. G. Bowles, A. S. Bramworth, J. Brereton, J. K. Bridcut, K. W. Bridges, Sir George Briggs, Messrs. W. B. Broadbent, K. P. Brockway, A. Kendall Brooke, J. A. Broughall, D. C. Brown, F. J. W. Brown, H. Brown, T. W. Brown, J. G. Bruce, P. J. Buchanan, R. Bugler, A. Ball, C. J. Bullard, J. Burnham, M. G. Burrows, T. K. Burrows, Captain C. A. F. Busk, Messrs. B. C. Butler, H. L. Butler, R. Butler.

Messrs. J. W. Caldwell, K. R. M. Cameron, A. Campbell, W. M. Cann, J. H. Cansdale, K. Cantlie, E. J. Card, D. R. Carling, J. D. B. Carmichael, G. W. Carpenter, Desmond Carter, J. F. Casson, E. Y. Caswell, J. Cave, W. W. A. C. Chalmers, E. E. Chapman, H. T. Chapman, T. R. Charlesworth, R. J. B. Chatterton, T. E. Chidlow,

Messrs. G. R. Chrimes, T. E. Chrimes, E. F. Clark, Colonel H. E. Clark, Messrs. J. F. Clarke, E. Claxton, W. W. W. Clayton, A. S. Clegg, H. Clements, O. A. Clifford, R. L. P. Cobb, C. S. Cocks, G. C. Cocks, N. Coles, G. Collingwood, A. F. Collins, B. Collins,

Messrs. C. E. Collins, W. B. G. Collis, J. N. Compton, K. J. Cook, B. W. C. Cooke, E. C. Cookson, D. F. Cooper, J. Cooper, P. C. Cooper, R. S. Cooper, S. E. Coppen, G. J. Corson, E. S. Cox, Sir John E. Cradock-Hartopp, Messrs. M. A. Crane, W. A. L. Creighton, W. N. Crimp, O. J. Crompton, R. C. Crouch, T. A. Crowe, T. C. Crump, R. L. Curl, J. H. Currey, G. R. Curry, W. E. Curtis.

Messrs. M. H. Dale, A. C. C. Damant, H. M. Dannatt, A. Darlow, E. O. Daum, S. C. Davey, A. S. Davidson, H. Davies, G. V. Davy, A. L. B. Dawson, C. R. Dawson, D. Dawson, A. G. Day, R. J. Day, J. Dearden, E. R. Denny, S. R. Devlin, F. Dickson, W. H. Dixon, G. G. Dobson, K. Docksey, R. E. Dore, D. Douglas, G. H. Dowsett, R. J. Drury, J. W. Duggan, J. Duncan, A. W. J. Dymond.

Messrs. T. S. St. J. Eady, H. J. Ebner, The Rt. Hon. Sir David Eccles, Messrs. A. C. Edrich, H. N. Edwards, Sir John Elliot, Messrs. G. E. Embleton, A. H. Emerson, P. Emmerton, J. A. Esplin, E. M. Eustace, A. P. Evans, C. J. Eydmann,

Messrs. E. R. Farmer, W. D. Farrington, J. Farrow, W. Featherstone, Lt.-Colonel L. F. R. Fell, Messrs. A. D. Ferguson, J. W. Ferguson, J. J. Finlayson, J. T. Fleming, B. G. V. Forman, I. C. Forsyth, A. Frampton, W. Francis, A. E. Frost, C. T. Fry, H. W. Fulton, W. J. Fulwell,

Messrs. E. P. Gabriel, W. Galloway, M. A. Gardiner-Hill, C. E. Gayes, H. F. S. Gedge, W. T. Gedge, A. C. Gibbons, A. Gibson, J. L. Gilbert, A. S. Gillitt, B. D. Giordan, R. K. Glascodine, — Goddard, G. Godfrey, G. C. Gold, H. R. Gomersall, Dr. B. L. Goodlet,

Messrs. C. L. Gormley, T. W. Gould, D. J. Gourlay, A. H. Grainger, J. M. Grammer, E. W. Greaves, T. E. Green, H. Greenham, E. W. Greensmith, H. Gresham, R. Gresley, W. Griffiths, J. R. Grimsdell, J. A. P. Grose, G. Grubb, R. L. Guest,

Messrs. D. W. Hadfield, J. Hadfield, T. O. M. Halliday, J. R. Hammond, R. F. Hanks, J. Hannah, E. W. Hanslip, F. D. M. Harding, L. W. Harding, N. Hargreaves, J. F. Harrison, G. T. Hart (*Secretary*), G. V. Harvey, R. F. Harvey, R. J. Harvey, E. G. Hassall, C. A. F. Hastilow, M. S. Hatchell, C. G. Hatherley, A. P. Hatz, S. G. Hearn, C. H. Heavey, R. J. P. Heck, A. Henderson, M. A. Henstock, P. A. J. Hernu, P. M. Hesketh, M. F. Hesse-Phillipson, J. L. Hewitt,

Messrs. F. A. Hewson, H. H. Hibbert, W. E. Hicks, G. R. Higgs, J. Hill, D. G. Hippert, A. J. Hirst, A. E. Hoare, The Hon. E. K. Hoar,

Messrs. H. M. Hoather, E. J. Hobbs, H. W. Hobbs, R. G. Hodges, R. B. Hoff, R. J. Hogben, H. Holcroft, B. Holroyde, A. Hood, A. G. Hopking, C. P. Hopkins, V. H. Hopkins, R. G. Hooker, F. Horne, F. E. Hough, F. A. Howard,

J. B. S. Howard, R. Howard, T. G. Howard, A. G. Howe, Colonel W. H. Howlett, Messrs. E. P. Hubbard, J. T. Hudson, J. W. Hudson, A. Huffinley, D. Hughes, H. J. Hulme, T. R. M. Hume, P. Humphris, C. Hutton, P. J. Hyland, C. G. H. Hyslop,

Messrs. L. W. Ibbotson, B. G. Illingworth, F. B. Ilston, C. C. Inglis, H. G. Ivatt, K. T. Ivy, G. C. Jackson, C. E. James, P. G. James, G. E. Jarman, J. M. Jarvis, A. E. Jefford, H. C. Johnson, J. D. Johnson, N. Johnson J. J. Johnston, R. Johnston, J. S. Jones, W. L. Jones, S. Jones-Frank.

Messrs. S. P. Kay, J. V. Keene, G. Kelland, H. V. Kelly, W. Kelway-Bamber, E. Kent, W. G. Keford, D. M. Kelsey, E. H. Ker, J. Carmichael, G. W. Carpenter, Desmond Carter, J. F. Casson, E. Y. Caswell, J. Cave, W. W. A. C. Chalmers, E. E. Chapman, H. T. Chapman, T. R. Charlesworth, R. J. B. Chatterton, T. E. Chidlow,

Messrs. G. R. Chrimes, T. E. Chrimes, E. F. Clark, Colonel H. E. Clark, Messrs. J. F. Clarke, E. Claxton, W. W. W. Clayton, A. S. Clegg, H. Clements, O. A. Clifford, R. L. P. Cobb, C. S. Cocks, G. C. Cocks, N. Coles, G. Collingwood, A. F. Collins, B. Collins,

Messrs. C. E. Collins, W. B. G. Collis, J. N. Compton, K. J. Cook, B. W. C. Cooke, E. C. Cookson, D. F. Cooper, J. Cooper, P. C. Cooper, R. S. Cooper, S. E. Coppen, G. J. Corson, E. S. Cox, Sir John E. Cradock-Hartopp, Messrs. M. A. Crane, W. A. L. Creighton, W. N. Crimp, O. J. Crompton, R. C. Crouch, T. A. Crowe, T. C. Crump, R. L. Curl, J. H. Currey, G. R. Curry, W. E. Curtis.

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Messrs. O. S. Naylor, A. D. Neale, G. H. Negus, Sir George Nelson, Messrs. R. E. Nelson, R. W. Nesbit, S. Newman, H. Newsam, N. Newsome, W. H. Nicholson, J. C. Nisbet, W. F. Noble, O. S. Nock, G. E. Norris, P. Norris, M. A. Nur, H. P. Oldham, J. H. Onions, E. C. Ottoway, G. T. Owen, J. E. Owston.

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Messrs. C. T. Roberts, F. B. Roberts, R. C. Roberts, A. S. Robertson, Sir Brian Robertson, Messrs. D. J. C. Robertson, E. A. Robinson, Sir Leslie Robinson, Messrs. M. D. Robinson, D. H. Rooney, C. G. Roper, F. B. Rose, J. Rostron, W. J. Ruston, C. F. Ryan.

Messrs. J. Samuel, H. C. Sarin, S. H. Saunders, M. G. Sawyer, L. M. Sayers, N. Schofield, S. S. Schofield, T. Schur, J. S. Scott, P. C. Searle, Sir George Seel, Messrs. E. W. Selby, J. H. A. Sharpley, A. A. Shenfield, F. E. Sheppard, Colonel O. Sherlock, Messrs. D. G. Shipp, F. Shore, M. W. Shorter, J. D.

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Messrs. C. J. Tafft, A. T. H. Taylor, A. H. Taylor, E. Taylor, F. B. Taylor, G. H. Taylor, L. D. Taylor, Sir Reginald Taylor, Messrs. G. Tew, F. Theakston, M. J. Theakston, A. E. Thomas, D. R. Thomas, G. Thomas, W. B. Thompson, W. T. Thompson, Grp. Captain P. G. Thomson, Messrs. T. B. L. Thomson, J. Thorpe, W. G. Thorpe, Major E. B. Todd, Messrs. G. W. Todd, R. W. Todd, Colonel W. L. Topham, Messrs. C. L. Trask, E. D. Trask, J. Travilla, M. S. Trenaman, J. S. Tritton, A. W. Trow, R. M. Tufnell, His Excellency Tunku Ya'Acob, Messrs. A. Turner, D. Turner, J. Turner, K. D. S. Tyler.

Messrs. W. Vandy, Lt.-Colonel C. Vaughan, Messrs. L. S. Vaughan, J. F. B. Vidal, C. C. Waddington, C. C. H. Wade, F. Wakefield, W. J. Wakley, G. Walker,

Messrs. A. F. Walters, J. R. Walton, Maj.-General L. Wansbrough-Jones, Messrs. R. W. Ward, S. B. Warder, W. Watson, B. T. Watts, F. J. R. Watts, S. Watts, J. C. Way, W. H. Webb, R. E. G. Weddell, G. A. Weeden, D. W. Wells, E. D. Wells, G. M. Wells, H. C. W. Westwood, R. C. Whalley, E. L. E. Wheatcroft, H. A. A. White,

Messrs. E. N. White, E. T. White, H. B. White, S. White, F. Whyman, H. Wilcock, P. D. Wild, R. S. Wild, A. V. Wilkin, A. Williams, G. E. H. Williams, W. Cyril Williams, H. Wilmot, E. J. Wilson, W. H. Wilson, A. J. L. Winchester, J. P. Winder, G. F. Wix, H. Wolstenholme, F. H. Wood, G. K. Wood, J. A. Wood, D. G. Woodman, W. Worth, H. T. G. Wright, M. G. Young.

BRITISH RAILWAYS STATION-USER FIGURES ISSUED.—British Transport Advertising has issued figures giving close estimates of the numbers using certain British Railways stations each year. The Commercial Advertising Service of the British Transport Commission has prepared this information for advertisers. Most of the 85 stations chosen serve the centres of marketing areas.

GERMANIUM RECTIFIER MANUFACTURE BY HACKBRIDGE & HEWITTIC ELECTRIC CO. LTD.—After some 50 years manufacture of high-power mercury arc rectifier equipment the Hackbridge & Hewittic Electric Co. Ltd., of Walton-on-Thames, has enlarged its facilities to include the supply of rectifiers using semi-conductor elements for low- and medium-voltage applications, and has in full production a department for the complete manufacture, assembly, and testing of germanium diodes of the air-cooled and water-cooled types for use in Hewittic rectifiers. The company recognises the possibilities of this new type of rectifier and as a result has been proceeding with research and development for several years. The plant now installed has been scientifically arranged in a new extension in which every facility has been incorporated for the most effective production.

Barking Station Reconstruction

Planning consent is being sought to enable work to begin this year on the construction of the new station buildings at Barking on the London, Tilbury & Southend Line, British Railways, Eastern Region. The buildings will form part of the Barking Station reconstruction scheme.

The concourse, which will be considerably larger than the existing one, will have a seven-window ticket office and shops, accessible both from the concourse and the street, for a tobacconist, newsagent, and confectioner. There will also be separate enquiry and parcels offices. Illuminated train time indicators, public telephone call offices, and automatic machines will be installed.

The siting of the main building immediately behind the existing structure will allow the present station facilities to remain in use for passengers during a major part of the construction period. On the platforms, most of the existing buildings will be replaced by more adequate accommodation, including waiting rooms, lavatories and kiosks. Improved staff amenities will be provided.

Reinforced Concrete Structure

The main building, which will be built entirely over the running tracks, will be a reinforced concrete structure on piled foundations. The structure will be composed largely of pre-cast pre-stressed members which will simplify construction and give the least interference to the running of trains.

A feature of the concourse will be slender reinforced concrete columns supporting a folded roof or pre-cast pre-stressed concrete beams and planks. Full glazing between the columns will give a

clear and light interior. Where brick-work is used, it will be of London stock facing bricks as used in other new work nearby. Commercial development schemes are under consideration for the frontages adjoining and opposite the station.

The buildings, which will take approximately two years to complete, have been designed by Mr. H. H. Powell, Regional Architect, under the general direction of Mr. A. K. Terris, Chief Civil Engineer, Eastern Region.

Acceptance Testing of British Built Maybach Engines

Type testing of the first Maybach rail traction diesel engine to be assembled by the British licencees, Armstrong Siddeley Motors Limited, has been completed. The engine, the turbocharged 12-cylinder vee-type MD 650, is the first of a pilot batch of 10, part of the British Railways contract for 70 engines of this type for use in the Swindon-built D 800 series diesel-hydraulic locomotives.

The continuous traction rating in accordance with B.S. 2953, 1958, is 1,152 b.h.p. at 1,500 r.p.m., and the intermittent rating 1,267 b.h.p. at 1,550 r.p.m.

All the engines in the pilot batch are being assembled from imported components. This procedure has been adopted to enable the planning, production, and test staff to make a detailed examination of the components to be produced and tested.

Production planning is now in hand at the company's Ansty works, near Coventry, where a large modern building

is being equipped for Maybach engine production. £475,000 is being spent on tooling and equipment, most of which is scheduled for installation by the end of April. Production is to begin in October, with an initial target of eight engines a month of the 12-cylinder version.

The licence agreement with Maybach Motorenbau G.m.b.H. covers the exclusive manufacture and selling of Maybach engines in the U.K., engines installed in equipment for overseas except Western Europe and the U.S.A., and engines for countries in the British Commonwealth.

It is intended to manufacture the complete M.D. range, covering 300-3,000 h.p. for rail traction, marine, and industrial applications.

New Goods Depots in L.M. Region

Work has begun in British Railways, London Midland Region, on new sheds for outward goods traffic at Manchester and Chester and on a new parcels depot at Oldham Clegg Street.

Construction of 13 similar depots in other parts of the Region and at two marshalling yards is to begin shortly.

The shed at Manchester Oldham Road will provide covered accommodation for 132 wagons. That at Chester will accommodate 79. Each shed is of a simple standard steel design specially developed for the goods traffic improvement scheme referred to in our February 6 issue, to afford maximum economy in cost and manpower with rapidity in erection.

The shed is open-sided, with a protected metal roof covering and is asbestos sheeted down the sides to within 7 ft. of the ground. Roofs are glazed and lighting is fluorescent. Vacuum testing equipment for fitted wagons is to be installed.

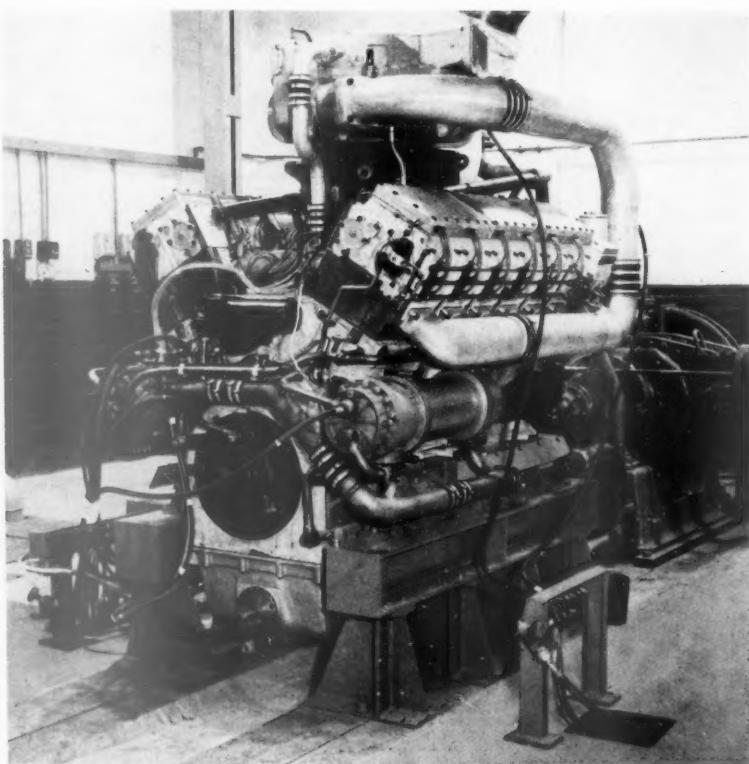
At Oldham Clegg Street the yard is being remodelled to provide a new parcels depot which will include decks for sorting and off-loading. The shed is similar in character and type to those at Manchester and Chester. New offices are being built alongside.

Parliamentary Notes

Electrification

The Earl of Gosford, Lord in Waiting, replying for the Ministry of Transport & Civil Aviation in the House of Lords on February 24, stated that there was no question of dispensing with steam traction on the railways. The B.T.C. was completely free to select the sort of equipment it wanted. At present the Commission's resources were at full stretch in implementing most of the electrification schemes outlined in the White Paper. The modernisation plan, he said, was in top gear. Locomotives were coming forward at a good pace, and in some cases would be introduced faster or in greater numbers than was thought possible in 1956 or even in 1958.

"We shall have to put up with works on the lines until modernisation is complete," he added. "Work is proceeding on the North Kent coast scheme, and Stage 1 of this should be complete by the middle of this year. The Fenchurch Street-Southend scheme is going according to plan, and is expected to be completed in 1961. Stage 1 of the Glasgow suburban scheme (due to be completed in mid-1960) and the Hertford East-Bishops Stortford schemes are both well under way. The Colchester-



Maybach MD 650 Vee-12-cylinder engine on test bed at Armstrong Siddeley Motors Limited works

Chelmsford scheme is due to be completed in September, 1961.

On main-line electrification, the Commission is at present concentrating all its available resources on the London Midland route from Manchester and Liverpool to Euston, and hope to accelerate its completion.

"That list takes no account of the schemes which the Commission already has completed. Some of these, admittedly, were not included in the modernisation plan, but to ignore them would distort the picture of the very real progress that the Commission has made in this field.

"Between January, 1955, and the end of last year the Commission had brought into service 103 main-line diesel locomotives, 787 diesel shunting locomotives and 2,000-odd diesel multiple-unit vehicles. In December last year and in January this year multiple-diesel units were becoming available at the rate of 70 per month."

Lord Gosford explained that he was usually in a position to argue with Lord Ailsa on subjects such as safety and drivers' lapses over signals, but he had no doubt that the Chairman of the Transport Commission would read the remarks of the noble Marquess to see whether any suggestion which he had made for improvement could, in fact, be introduced.

The problem of unaccountable lapses on the part of drivers to observe signals was being examined by the Medical Research Council, at the invitation of the B.T.C.

Questions in Parliament

Victoria Tube Estimates

Sir Wavell Wakefield (Marylebone—C.) asked the Minister of Transport & Civil Aviation on February 25 what estimates had been made as to the extent to which travel congestion in central London would be relieved by the expenditure of £50 million on road improvements in London, compared with a similar sum spent on the proposed Victoria Line tube.

Mr. Harold Watkinson, in a written answer: The relief of travel congestion from the Victoria Line or from a similar expenditure on road improvements are not directly comparable; but undoubtedly either would draw some traffic off the other and both would generate some new traffic. I expect the London Travel Committee to advise me on the contribution which the tube would make and my Ministry is also studying the problem of road improvements.

Sir Wavell Wakefield also asked what estimates have been made as to the extent to which expenditure on the proposed Victoria tube would help to relieve unemployment, compared with a similar expenditure on roads, bridges, and flyovers.

Mr. Watkinson, in a written answer: The London Transport broad estimate of the measure of the labour element involved in a six-year programme to build the Victoria Line tube and its rolling stock is not less than 50,000 man-years. The total labour involved in the same expenditure on road schemes would probably be about one-tenth of that figure.

EASTERN AND N.E. REGIONS "RAILROVER" TICKETS.—"Railrover" tickets, valid seven days, are on sale until October 31, one available at will within the Eastern and the other within the North Eastern Region of British Railways. The Eastern Region ticket costs £9 first and £6 second class. For the North Eastern Region the prices are £7 10s. and £5 respectively.

THE RAILWAY GAZETTE

Contracts and Tenders

London Transport Executive order for rolling stock

The London Transport Executive has placed an order with Cravens, Limited, Sheffield, for 248 cars to make up eight-car trains for the Metropolitan Line. They will replace the present outdated electric and steam compartment stock on the Amersham, Chesham, and Watford services. The trains will have lightweight unpainted aluminium bodies. Delivery will commence in 1960, and will be completed in 1962. The value of the contract is some £4,000,000.

Canadian National Railways has placed orders for 140 diesel locomotives to the value of some \$25,000,000. Montreal Locomotive Works Limited will supply 50 main-line shunting locomotives of 1,800 h.p. and 26 hump yard shunters of 1,000 h.p. General Motor Diesel Limited, London, Ontario, will build 38 main-line shunting locomotives of 1,200 h.p., and 24 of 1,750 h.p., and two 1,200-h.p. yard shunters. The 26 hump yard locomotives are being purchased for operation in the hump yards now under construction at Montreal and Moncton.

East African Railways has placed an order with Metropolitan Cammell Carriage & Wagon Co. Ltd. for eight second class coaches to the value of some £126,000. These coaches have been designed for family travel and are the result of an experimental coach which has been in service in Kenya and Uganda. Public reaction has been noted and to meet requests the new rolling stock will have in each carriage three six-berth compartments and five three-berth compartments. Four of the three-berth compartments will have communicating doors. Delivery will start in August, 1960.

Rhodesia Railways has placed an order with Metropolitan Cammell Carriage & Wagon Co. Ltd., for 15 passenger guards and baggage vans.

The Chihuahua al Pacifico Railway in Mexico recently placed an order for five 1,600-h.p. (traction) general-purpose diesel-electric locomotives with Fairbanks, Morse & Company, Chicago, U.S.A.

The British Transport Commission has awarded a contract to Hayward Tyler & Co. Ltd., a member of Stone-Platt Industries, Limited, for the removal of the original beam engine pumps installed at the Suibrook and Sea Wall pumping stations, Severn Tunnel, and for their replacement with high-tension electromechanical pumps. The units include 10 250-h.p. and two 200-h.p. motors operating on 3,300 V., and two 60-h.p. motors operating on 415 V. The contract will take 2½ years to complete because of the necessity of keeping the tunnel free of water during the conversion.

The London Transport Executive has placed a contract with William Old Limited, Harrow, Middlesex, for civil engineering work at Amersham, Metropolitan Line, and other stations. The value of the contract is some £125,000 and the work is due for completion in 17 months.

British Railways, Eastern Region, has placed the following contracts:

Bagguley & Barker, Limited: remedial

measures to track formation, between Saxilby and Stow Park

W. & C. French, Limited: construction of new station footbridge No. 1481 at Bishops Stortford

Escay Fencing Contractors, Limited: supply and erection of concrete post and wire fencing and rewiring alongside running lines, in the Kings Cross district

W. & C. French, Limited: construction of new signalbox at Ware, and new wharf wall at Thames Wharf, Canning Town.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call for tenders as follows:

From South Africa:

89 11,000/6,600-V., 200-A., three-phase, 50-cycle, ganged outdoor-type air-break on-load isolators, in accordance with S.A.R. spec. E.N.W.S.EIC.1/5

Alternatively

259 11,000/6,600-V. 200-A., three-phase, 50-cycle, ganged outdoor-type air-break on-load isolators, in accordance with S.A.R. spec. E.N.W.S.EIC.1/5.

The issuing authority is the Stores Department, South African Railways. Bids in sealed envelopes, endorsed "Tender No. C.7654: Isolators" should be addressed to the Chairman of the Tender Board, P.O. Box 7784, Johannesburg. The closing date is March 20, 1959. Local representation is essential. The Board of Trade reference is ESB/4615/59.

Further details regarding the above tender, together with photo-copies of tender documents, can be obtained from the Branch (Lacon House, Theobalds Road, W.C.1).

Further information has been received regarding the call for tenders from Sudan for 2,000 standard tyres for carriage and wagon wheels, reported in last week's issue. Tyres should be supplied to drawing No. 408/2986 and British Standard Report No. 24 part 2—1956. Tenderers should state the time of delivery and the brand of steel from which the tyres will be manufactured. Prices should be quoted on both f.o.b. and c.i.f. Port Sudan basis, and tenders must be valid for one month from the closing date. A copy of the drawing is available at the Board of Trade for loan to United Kingdom firms on application, quoting reference No. ESB/4268/59.

N.E. REGION MUTUAL IMPROVEMENT CLASSES.—The final of British Railways North Eastern Region, Mutual Improvement Class Quiz competition took place recently in York between teams representing the West Auckland and Mirfield Motive Power Depots. The West Auckland team won with 62½ points, and has thus qualified for the inter-Regional ties to be held on March 11. Mr. F. H. Petty, Motive Power Superintendent, North Eastern Region, was question master. The awards were presented by Mr. H. A. Short, General Manager, North Eastern Region. Sir George Walton and Mr. J. Bowman, Members of the North Eastern Area Board of the British Transport Commission, were present.

Notes and News

Small & Parkes Limited New London Office and Depot Address.—Small & Parkes Limited, makers of the Don brake and clutch linings, has announced that its London sales office will move, tomorrow, from 76, Victoria Street, S.W.1, to 251, Kingston Road, London, S.W.19, tel: Cherrywood 3806/7. The depot will move to the same address on March 21.

British Railways, London Midland Region, Lecture & Debating Society.—On March 12, Sir Brian Robertson, Chairman of the British Transport Commission, will give an address to the London Midland Region Lecture & Debating Society, in the Clerical Staff Dining Club, Cardington Street, Euston, N.W.1, at 5.45 p.m. The subject chosen is "Railways—their task and their responsibilities," and the meeting will be an open one. Mr. David Blee, General Manager, London Midland Region, will be in the chair.

L.T.E. Underground Timetable Alterations.—Alterations to London Transport Underground timetables, effective from March 2, include recasting of the Northern Line timetable to give self-contained services, via both Charing Cross and the Bank, to the several branches and, in the main, a standard pattern of destinations with trains running between the same points throughout the day. This should prevent delays on one section being transmitted to others. Increased running time, including slightly longer booked stops at busier stations, and longer terminal layovers have been arranged where possible to aid timekeeping and regularity, particularly during peak hours. On Mondays to Fridays, at peak periods, additional trains to and from Morden run via Charing Cross. All trains from the City run to the Edgware and Barnet branches. As an economy measure, the service frequency between about 10 a.m. and 4 p.m. is reduced to 10 min. on the Edgware branch beyond Colindale and to 15 min. on the High Barnet branch beyond Finchley

Central and on the Mill Hill East branch. The service interval to Finchley Central remains at 5 min. On the Piccadilly Line, between about 10 a.m. and 4 p.m., Mondays to Fridays, all trains terminate at Rayners Lane. The through Piccadilly Line service to and from Uxbridge at other times, including the peak hours, is not affected. A further economy measure is the curtailing at Barons Court of trains which previously terminated at Acton Town during the middle of the day on Mondays to Fridays. On Sundays the service interval is widened on most Underground lines, mainly in the afternoon and evening.

Herbert Morris Limited Acquires British Monorail Limited Shares.—The British and American shares of British Monorail Limited have been acquired by Herbert Morris Limited, Loughborough. British Monorail Limited specialise in the design and manufacture of overhead handling equipment, including underslung cranes. Under the new arrangement the company will be able to finance the final stage of the introduction of a new range with a load-carrying capacity up to 10 tons.

"The Maid of the Mountains."—"The Maid of the Mountains," the musical play, was presented last week by the Great Western Railway (London) Operatic Society at the Scala Theatre, London, W.1. This popular show was admirably suited to the outstanding ability of the cast, which comprised members of the clerical staff in the London area of the Western Region of British Railways with guest players well known in the amateur theatre. The title role was excellently played and sung by Miss Jane Munday, and Mr. Frederick Toon was an impressive figure as Baldasarre. Messrs. Walter Jenkins and Ronald Ratcliffe gave first class performances as Tonio and General Malona respectively. Misses Vicki Cuthbert and Jean Henderson charmingly portrayed the roles of Vittoria and Angela, and Messrs. Donald Pottinger, John Harrap, Ronald Davis, Harry Davidson and Frank Johns

played the parts of the Brigands. Messrs. James Lightfoot, Barry Dorn and Stanley Pearson were excellent in their respective parts of Crumple, Lieutenant Rugini and Corporal Terroni. Both Mr. Albert Steward, the Conductor & Honorary Director of Music, and Miss Mavis Ward, who was responsible for the production and choreography, are to be congratulated on the fine results they achieved.

Demand for Tote System.—British Railways, London Midland Region, reports considerably increased demand for the Tote system for transport of powders, oils, paints and commodities of similar consistencies. One firm, which initially required 50 bins for carbon black, now needs 500. Traders dealing with china clay, activated carbon, and impregnated pitch have expressed satisfaction with the system. A description of the Tote system was given in our October 24, 1958, issue.

Industrial Film Festival.—The second Festival of Films in the Service of Industry will take place at Harrogate from April 21 to April 25 inclusive (see editorial not in this week's issue). Because of the success of the first Festival in October, 1957, it has been decided to form an Association to be incorporated as a registered company limited by guarantee in the title "Festivals of Films for Industry Limited." Enquiries regarding the coming Festival at Harrogate should be addressed to the Festival Officer, Festival of Films in Service of Industry, 3, Portman Chambers, 7-9, Baker Street, London, W.1.

Switchgear & Equipment Limited at the Electrical Engineers Exhibition.—Switchgear & Equipment Limited will exhibit a large selection from its range of outdoor and indoor isolators and switchgear at the Electrical Engineers Exhibition at Earls Court, London, from March 17 to 21. Exhibits will include outdoor isolators ranging from 6.6 kV. upwards, including the new track section isolator type "TS" designed for British Railways. Four different types of power operating mechanism for outdoor isolators will be on show, two of them in full working order. Oil immersed gear will include the 11-kV. indoor cubicle-mounted circuit breaker type "AHV," and two types of 11-kV. outdoor pole-mounted self-reclosing circuit breaker.

Horwich Works Training School Officially Opened.—The apprentice training school at Horwich Locomotive Works, British Railways, London Midland Region, was officially opened by Lord Rusholme, Chairman of the London Midland Area Board, on February 27. The event marked the completion of the London Midland Region programme to provide a works training school at each of its six Locomotive and Carriage and Wagon Works, with a similar establishment in London. The school will provide preliminary practical and theoretical instruction to every entrant for one year. After 12 months the apprentice trainee will be transferred to the works and training continued until the age of 21.

Western Region Women's First Aid Competition.—The British Railways, Western Region, Women's First Aid Competition was held at Old Oak Common Hostel, London, on February 24. Drs. B. M. Watney and F. H. Taylor of London were the adjudicators. The subsequent proceedings were presided over by Mr. S. G. Ward, Regional Establishment & Staff Officer. The trophies and prizes pre-



Brush Type "2" A1A-A1A locomotive D5520 first of 60 for the Eastern Region with power increased from 1,250 h.p. to 1,365

sented by Mrs. M. G. R. Smith, wife of the Chief Civil Engineer. The vote of thanks to the adjudicators and other helpers was proposed by Mr. S. Stevens, District Engineer. Mr. Ward was supported by Mrs. Ward, Mrs. M. G. R. Smith, the adjudicators, Mr. S. Stevens, District Engineer and Mr. J. A. Martin, Regional Ambulance Secretary. The Class 1 section was won by the Newton Abbot team, which will now compete in the British Railways, Docks & London Transport (Railways) Competition for Women, which is being arranged by the St. John Ambulance Association at the Central Hall, Westminster, S.W.1, on June 5. The Class 2 section was won by the Cardiff Police team.

Western Region Train Alterations.—With the closing from March 2 of Wrangaton, Biffaford, Ivybridge, Cornwood, and Plympton Stations on the Western Region main line between Newton Abbot and Plymouth, the 12.30 p.m. from Newton Abbot to Plymouth is discontinued, and the 1.55 and 4.20 p.m. from Penzance to Newton Abbot now terminate at Plymouth. Other local trains between Newton Abbot and Plymouth are accelerated 8-10 min. Additional calls at Totnes are made by the 11 a.m. from Penzance to Paddington and the 6.7 p.m. from Plymouth to Bristol. The 9.30 a.m. from Paddington to Plymouth calls additionally at Westbury, whence there is a new connection to Frome.

Increasing Capacity of Dunoon and Rothesay Car Ferries.—The Caledonian Steam Packet Co. Ltd. is carrying out alterations on mv. *Arran*, *Bute*, and *Cowal*, working the motorcar ferry services between Gourock and Dunoon and Wemyss Bay and Rothesay, so as to increase the carrying capacity of the vessels. The open hatchways on the after-decks are being plated over and the derricks and associated gear removed. Each vessel will then be able to carry eight additional cars, and delays previously experienced during the peak summer season will be reduced. The increased capacity will be useful during winter week-ends to motorists touring Bute



Lord Rusholme unveiling the commemorative plaque at Horwich Works training school: on the left are Mr. David Blee, General Manager, London Midland Region, and Mr. R. F. Summers, Member of the London Midland Area Board

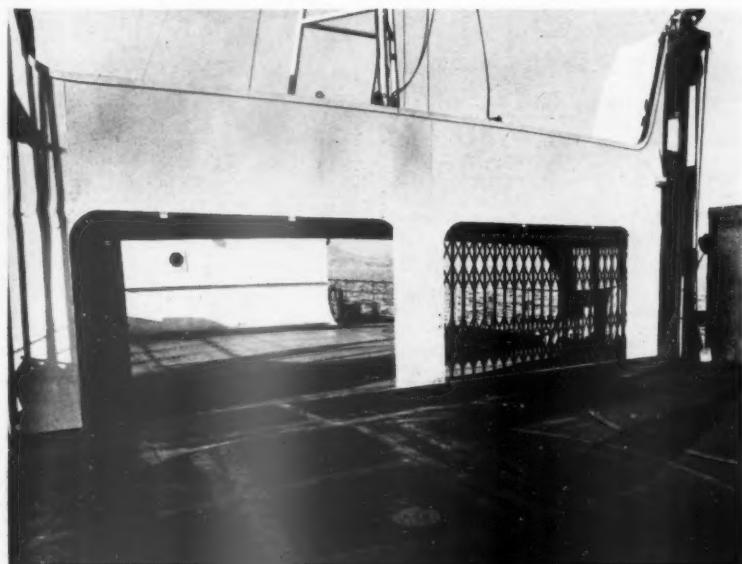
or the Cowal coast. The alterations to the mv. *Arran* have been completed. Capacity has been increased from 26 to 34 motorcars and the appearance of the vessel has been enhanced. Mv. *Glen Sannox*, which maintains the service between the mainland and Arran, is the largest vessel in the fleet, with capacity for some 40-50 cars.

Train Alterations in L.M. Region.—From March 2 the 9.45 p.m. sleeping car train from Edinburgh Waverley to St. Pancras, which is worked by the London Midland Region from Carlisle via Leeds, Sheffield, and Nottingham, starts at 10.5 p.m., ceases to run via Derby, and reaches St. Pancras at 9.10 instead of 9.20 a.m., an acceleration of 30 min. The relief "Irish Mail," leaving Euston for Holyhead at 8.45 p.m. on Fridays and hitherto con-

ditional, now becomes regular. It runs non-stop to Holyhead, arriving at 2.15 a.m., and is followed by the regular train at 8.52 p.m. from Euston. With the closing of the Midland & Great Northern section of the Eastern Region, the local service between Bourne and Nottingham via Saxby and Melton Mowbray is withdrawn. In place of the through Birmingham-Leicester-Melton-Yarmouth service new diesel trains are run from Leicester at 2.10 p.m. to Birmingham and Birmingham at 2.15 p.m. to Leicester.

Revised Weekday Service between Norwich and Melton Constable.—The train service between Norwich Thorpe and Melton Constable via Cromer, British Railways, Eastern Region, which was not altered at the time of other changes on the Great Eastern Line on January 5, has been revised to fit more closely into the East Anglian interval train service pattern. The main alterations are the re-timing of trains between Melton Constable and Norwich to give generally improved connections with the services to Ipswich and London; the co-ordination of road and rail services at Melton Constable to provide connecting road/rail services for passengers previously served by the Midland & Great Northern Line; and better connections at Norwich to and from Ely, the Midlands, and the North of England.

British Railways, North Eastern Region Export Express Service Extended.—British Railways, North Eastern Region, has extended certain of the "Export Express" services for freight traffic. The service for full wagon loads for shipment through the Port of Hull, introduced at 40 stations in June last year, is to be extended to include a further 20 forwarding points. The service which operated to the Royal India and Millwall groups of the London Docks from selected points in the Region has also been extended to embrace additional forwarding points. A new service has been introduced to cater for full loads of export traffic for shipment through the Port of Goole. This service is available from the principal forwarding points in the North Eastern Region and also from the principal industrial centres in other parts of the country.



Electrically-operated lift with turntable and entrance to additional car deck on Caledonian Steam Packet Co. Ltd. car ferry mv. "Arran"

Forthcoming Meetings

March 11 (Wed.).—Railway Discussion Group, Peterborough, at the Technical College, Eastfield Road, at 6.45 p.m. "The archives of the B.B.C.," illustrated by recordings, by Mr. Brian George, British Broadcasting Corporation, London.

March 12 (Thu.).—Railway Students' Association, at the London School of Economics & Political Science, Houghton Street, Aldwych, W.C.2, at 6.15 p.m. Paper on "Co-operation between European railways," by Dr. F. Q. den Hollander.

March 12 (Thu.).—London Midland Region Lecture & Debating Society, in the Clerical Staff Dining Club, Cardington Street, Euston, N.W.1, at 5.45 p.m. Address "Railways—their task and their responsibilities," by Sir Brian Robertson. Chairman Mr. David Bleee.

March 13 (Fri.).—Railway Correspondence & Travel Society, London Branch, at the Railway Clearing House, Eversholt Street, London, N.W.1, at 7.15 p.m. Paper on "Some interesting Continental locomotives," by Dr. P. Ransome-Wallis.

March 13 (Fri.).—Stephenson Locomotive Society, North Eastern Area, at the Demonstration Theatre, Northern Gas Board Showroom, 30, Grainger Street, Newcastle-on-Tyne, 1, at 7 p.m. Paper on "Narrow gauge railways at home and abroad," by Mr. J. B. Hollingsworth.

March 14 (Sat.).—Stephenson Locomotive Society, North Western Area, at the Manchester Geographical Society, St. Mary's Parsonage, Deansgate, Manchester, at 6.15 p.m. Paper on "John Ramsbottom, father of the modern locomotive," by Mr. F. C. Hambleton.

March 14 (Sat.).—Railway Correspondence & Travel Society, Sussex & Kent Branch, at the Railway Hotel, Brighton, at 6.30 p.m. Paper on "Southern Suburban," by Mr. O. J. Morris.

March 16 (Mon.).—Historical Model Railway Society, at the Caxton Hall, Westminster, London, S.W.1, at 7 p.m. Paper on "The Crich Tramway and its associations with the Midland Railways," illustrated, by Mr. A. Ranson Cowlishaw.

March 16 (Mon.).—Railway Correspondence & Travel Society, Merseyside Branch, at the Woodside Hotel, Birkenhead, at 7.30 p.m. Paper on "The North Eastern Railway," by Mr. T. Rounthwaite.

March 18 (Wed.).—Institution of Locomotive Engineers, at the Institution of Mechanical Engineers, 1, Birdcage Walk, London, S.W.1, at 5.30 p.m. Annual General Meeting, followed by a paper on "The electrogyro locomotive," by Mr. T. E. Green, Chief Traction Engineer, and Mr. J. K. Gessler, Traction Engineer, National Coal Board.

March 18 (Wed.).—Railway Correspondence & Travel Society, West Riding Branch, at the Talbot Hotel, Bradford, at 7.30 p.m. Paper by Viscount Garnock on "Railroad operations on the North American Continent."

March 19 (Thu.).—Diesel Engineers' & Users' Association, at the Institute of Marine Engineers, The Memorial Building, 76, Mark Lane, London, E.C.3, at 2.30 p.m. Paper on "Development of the Vee-type engine," by Mr. G. Hopwood.

March 19 (Thu.).—British Railways, Western Region, London Lecture & Debating Society, in the Headquarters Staff Dining Club, Bishop's Bridge Road, Paddington, W.2, at 5.45 p.m. Young men's discussion—"The opportunities afforded youth in the railway service and how they could be enhanced," preceded by the Annual General Meeting.

March 20 (Fri.).—Institute of Transport, at the Dorchester Hotel, Park Lane, W.1. Annual dinner.

March 20 (Fri.).—Stephenson Locomotive Society, London & Southern Area, at Caxton Hall, Westminster, S.W.1, at 6.45 p.m. Paper on "The S.L.S. jubilee and locomotive memories of 1909," by Mr. F. C. Hambleton.

March 21 (Sat.).—Stephenson Locomotive Society, North Eastern Area, at the Griffin Hotel, Boar Lane, Leeds, at 6.30 p.m. Paper on "The West Highland Railway in North British days," by Mr. H. A. Vallance.

March 21 (Sat.).—Stephenson Locomotive Society, North Western Area, in the Conference Room, Liverpool Central Station, at 7.30 p.m. Paper on "The Leek & Manifold Railway," by Dr. J. R. Hollick.

March 21 (Sat.).—Permanent Way Institution, East Anglia Section, at Cambridge, at 2.15 p.m. Paper on "High speed turnouts and crossovers," illustrated, by Mr. W. A. C. White.

March 24 (Tue.).—The Railway Club, at 320, High Holborn, London, W.C.1, at 6.30 p.m. Informal meeting with talks by Mr. R. C. Riley and Mr. N. W. Spinks.

March 25 (Wed.).—British Railways, Southern Region, Lecture & Debating Society, at the Chapter House, St. Thomas' Street, London, S.E.1, at 5.45 for 6 p.m. Annual general meeting and reading of prize essay. Mr. C. P. Hopkins, President, in the chair.

March 25 (Wed.).—Railway Students' Association, at the London School of Economics & Political Science, Houghton Street, Aldwych, W.C.2, at 6.15 p.m. Paper on "R.S.A.—the first 50 years," by Mr. S. B. Taylor, Chief Secretary, British Transport Commission.

Costa Rica ordinary stock was 14, the first debentures 76 and the second debentures 88. Chilean Northern first debentures were 54, while Guayaquil & Quito assented bonds changed hands up to 80 $\frac{1}{2}$. Paraguay Central prior debentures were 12 $\frac{1}{2}$. International of Central America common shares were quoted at \$23.

United of Havana second income stock eased from 6 $\frac{1}{2}$ to 6 and the consolidated stock changed hands around 1 $\frac{1}{2}$, while San Paulo Railway 3s. units were again quoted at 2s. and Brazil Railway bonds were 5 $\frac{1}{2}$. Mexican Central "A" bearer debentures moved up from 76 $\frac{1}{2}$ to 77.

There has been a sharp fall from 15s. 6d. to 13s. in Nyasaland Railways shares, the latest developments having dispelled hopes of a higher dividend; the 3 $\frac{1}{2}$ per cent debentures were 62, compared with 62 $\frac{1}{2}$ a week ago. West of India Portuguese capital stock held its advance, again changing hands around 104, with the 5 per cent debentures again quoted at 90.

Canadian Pacifics were more active and fractionally higher at \$54 $\frac{1}{2}$; the 4 per cent preference stock was 53 $\frac{1}{2}$ and 4 per cent debentures 65 $\frac{1}{2}$.

Engineering and kindred shares have been affected by a number of financial results showing lower earnings. North British Locomotive declined further to 10s. 6d., compared with 12s. 4 $\frac{1}{2}$ d. a week ago, because future earnings will have to show a substantial rise over those of recent years before dividends can be resumed on the ordinary shares, bearing in mind the cost of the loans now being made available for the company. Birmingham Wagon shares were 18s., while Charles Roberts 5s. shares eased further from 9s. to 8s. 9d. on the Hurns Nelson position, Beyer Peacock 5s. shares remained at 8s. Elsewhere, Westinghouse Brake at 43s. 9d. were within 3d. of a week ago. G. D. Peters eased from 27s. 6d. to 26s. 3d., but the shares remained firmly held, and it seemed the lower quotation was scarcely tested by dealings. Wagon Repairs 5s. shares reflected the easier trend of markets and were 10s. 3d., compared with 10s. 6d. a week ago.

In other directions, Gloucester Wagon 10s. shares strengthened from 17s. 9d. to 18s. 3d. Dowty Group 10s. shares were 42s. and Pressed Steel 5s. shares 24s. 3d. Associated Electrical changed hands around 45s. 6d., English Electric were 63s. 9d.xd, General Electric 32s. 3d.xd and Crompton Parkinson 5s. shares 13s. 4 $\frac{1}{2}$ d. but Tube Investments eased to 82s. 6d. British Oxygen at 52s. 6d.xd remained under the influence of the increase in the dividend from 10 per cent to 12 per cent. British Timken were 61s. 7 $\frac{1}{2}$ d., Murex 45s. and Ransome & Marles 5s. shares 17s. 4 $\frac{1}{2}$ d. Ruston & Hornsby rose further to 27s. 7 $\frac{1}{2}$ d.

Railway Stock Market

Among foreign rails, Antofagasta remained depressed. The ordinary receded further to 12 $\frac{1}{2}$, compared with 13 $\frac{1}{2}$ a week ago. The preference stock strengthened from 27 to 27 $\frac{1}{2}$, and the 4 per cent perpetual debentures were better at 37, compared with 36 $\frac{1}{2}$, while the 5 per cent (Bolivia) debentures again changed hands around 90 $\frac{1}{2}$. There has been little selling of any of the railway's stocks, but buyers of the ordinary and preference are cautious because it is realised that they have to be regarded mainly as long-term holdings.

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United of Havana second income stock eased from 6 $\frac{1}{2}$ to 6 and the consolidated stock changed hands around 1 $\frac{1}{2}$, while San Paulo Railway 3s. units were again

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